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## ASAT-isfaction: Customary International Law and the Regulation of Anti-Satellite Weapons

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# ASAT-ISFACTION: CUSTOMARY INTERNATIONAL LAW AND THE REGULATION OF ANTI-SATELLITE WEAPONS<sup>†</sup>

*David A. Koplow\**

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*"When I'm ridin' round the world*

*And I'm doin' this and I'm signing that"*

—The Rolling Stones, "(I Can't Get No) Satisfaction" 1965

Few people would suspect that those intense lyrics, central to possibly the greatest rock and roll song ever performed, in fact contain a cleverly encoded message expressing Mick Jagger's and Keith Richards' discreet homage to public international law. But that's how I see it: the evocative passage incorporates thinly veiled references to the two primary sources of international law obligations: things countries *do* (i.e., customary international law) and things countries *sign* (i.e., treaties).

That encrypted message is more relevant today than ever before, because both sources of international law may be critical, in hitherto unexplored ways, to the effort to preserve the fragile security of outer space. Novel types of anti-satellite (commonly abbreviated "ASAT" and pronounced "ay-sat") weapons threaten to jeopardize the peaceful exploration and exploitation of space. Unless public international law comes quickly to the rescue, perhaps via novel jurisprudential mechanisms, the tenuous stability of outer space, and the commercial and military reliance on satellite technology, will soon be jeopardized.

The argument in this Article proceeds through several steps. As background, Part I outlines the current and projected future human uses of outer space, emphasizing the plethora of civilian and military applications that now rely on satellites. The United States, especially, but other countries, too, are coming to depend on multiple space assets for the performance of a wide array of vital functions; the investment is huge, diverse, and growing, despite the costs and natural perils of operating in the harsh exoatmospheric environment.

In Part II, the Article describes the legal milieu, outlining the accomplishments of the 1967 Outer Space Treaty<sup>1</sup> and its progeny, as well

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1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

as describing the conspicuous gaps in the existing fabric of overt written international law.

Part III of the Article introduces the modern threats to space security, describing the ASAT activities of the leading spacefaring States and introducing the two main varieties of satellite-killing technologies. It annotates the history of developmental testing of those armaments, including the most recent provocations by China in January 2007 and by the United States in February 2008. Complementing that analysis, the Article describes the abortive efforts to negotiate arms control treaties to rein in those threats, now stretching back three futile decades, and the current U.S.-imposed blockage in the leading disarmament negotiating forum.

The Article then turns to my main thesis: that in the absence of a new outer space disarmament treaty, the world can productively turn to customary international law (CIL) as a viable alternative pathway toward enhancing space security and impeding the development and use of ASATs. To advance this novel argument, Part IV introduces “general customary international law,” defining it as a recognized, important, and dynamic source of jurisprudence and explaining where it comes from, how it operates, and, in particular, how it may impede the erstwhile freedom of sovereign States to proceed untrammelled toward the weaponization of space through the testing and use of ASATs.

Part V carries the analysis one step further, by delving into one “specialized” realm of CIL, the traditional rules that regulate the conduct of armed conflict. Centuries-old principles that were crafted and shaped for very different battlefield purposes may nonetheless find application in outer space, too, impeding at least some specified ASAT activities. As a companion, Part VI scrutinizes a rather different realm of *lex specialis*, the evolving customary international environmental law. Again, the analysis asserts that existing terrestrial environmental protection norms can find sometimes-surprising expression in the very different realm of space.

Lest the reader imagine that this inspection of CIL might be of only “theoretical” interest in the national security sector, Part VII presents an illuminating precedent. Chemical weapons (CW) were an equally hotly contested topic for decades of debate about global peace and security, with profound implications for national defense. In this area, CIL did, and still does, play an active role in outlawing selected forms of especially abhorrent warfare, wholly apart from the explicit constraints of treaty law. If it happened with CW, I argue, it could happen with ASAT, too.

Finally, the Article concludes with some policy recommendations, suggesting mechanisms for the world community to press forward with autonomous efforts to promote stability and security in outer space, even in the face of recalcitrance from the leading space powers. I would certainly support the negotiation and implementation of a comprehensive new treaty to prevent an arms race in outer space, and a carefully drafted, widely accepted accord could accomplish much, well beyond what customary law alone could create. But the treaty process, too, has costs and disadvantages, and the world need not pursue just one of these alternatives in isolation.

If the absence of global consensus currently inhibits agreements that countries could already *sign*, perhaps the world community can nevertheless get some “satisfaction” via the operation of CIL, constructing a similar (although not completely equivalent) edifice of international regulation of ASATs based simply on what countries *do*.

## I. THE UBIQUITOUS EXPLOITATION OF OUTER SPACE

Satellite services have become integral to all aspects of modern life, underpinning both the civilian economy and military operations around the globe. Secure, instantaneous communications links enable the quotidian range of television coverage, telephonic voice and fax links, Internet searches and email messages, and online shopping and ATM banking that we now take for granted. Satellite sensors provide the requisite data for daily global weather forecasting, as well as for monitoring earth resources such as seasonal crop harvests, encroachments on the rain forests, and the effects of global warming. Global Positioning System satellites enable inexpensive, accurate navigation by aircraft, ships, and an increasing fleet of private automobiles.<sup>2</sup>

Satellites now function as essential links in U.S. “critical infrastructure,” and the robust technological advantages have diffused to numerous other countries around the world, too. By one estimate, some 1100 cor-

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2. Robert G. Joseph, Under Sec’y for Arms Control & Int’l Security, Assuring America’s Vital Interests, Remarks on the President’s National Space Policy (Jan. 11, 2007), available at <http://statelists.state.gov/scripts/wa.exe?A2=ind0701b&L=dosdo&P=779> (last visited June 30, 2009) [hereinafter Remarks of Robert Joseph]. See generally STEVEN LAMBAKIS, ON THE EDGE OF EARTH: THE FUTURE OF AMERICAN SPACE POWER 13–31 (2001); PATRICIA MOLONEY FIGLIOLA ET AL., U.S. SPACE PROGRAMS: CIVILIAN, MILITARY AND COMMERCIAL 16 (Cong. Research Serv., Issue Brief for Congress, Doc. No. IB92011, 2006) available at <http://digital.library.unt.edu/govdocs/crs/permalink/meta-crs-10507:1> (last visited July 29, 2009); SPACESECURITY.ORG, SPACE SECURITY 2008, at 68–111 (2008), available at <http://www.spacesecurity.org/SSI2008.pdf> (last visited June 30, 2009) [hereinafter SPACE SECURITY 2008]; U.S. JOINT CHIEFS OF STAFF, DEP’T OF DEF., SPACE OPERATIONS, JOINT PUBLICATION 3–14, Jan. 6, 2009, at IV-16 [hereinafter JCS SPACE OPERATIONS].

porations now exploit space in one way or another,<sup>3</sup> and Kazakhstan recently became the forty-seventh nation to undertake its own civilian space activities<sup>4</sup>—and there is no indication that this proliferation will soon abate. Global commercial space revenues now exceed \$140 billion per year, and some estimate that the value of direct U.S. investment in outer space will soon reach half a trillion dollars, rivaling the size of U.S. capital investment in Europe.<sup>5</sup> Some 850 operational satellites now jockey for position, and outer space traffic has become congested, especially in the most favorable orbital sites; competition has also intensified for the allocation of scarce radio frequency slots for communicating with those spacecraft.<sup>6</sup>

In the military sector, photoreconnaissance satellites enable the United States and Russia reliably to monitor each other's long-range missiles and other strategic nuclear assets, while different exoatmospheric sensors capture electromagnetic pulses and radar images of minute earth movements that would evince clandestine nuclear weapons test explosions. Likewise, early warning satellites would provide the first alert in the case of a surprise missile attack and the fabled Washington, D.C. to Moscow "hotline" link for resolving superpower crises is satellite-enabled. A diverse array of spy satellites surreptitiously intercepts communications and other electronic emissions, enabling intrusive

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3. JOHN E. HYTEN, *A SEA OF PEACE OR A THEATER OF WAR: DEALING WITH THE INEVITABLE CONFLICT IN SPACE 7* (2000), available at <http://acdis.illinois.edu/assets/docs/277/ASEaofPeaceoraTheaterofWarDealingwiththeInevitableConflictinSpace.pdf> (last visited July 2, 2009).

4. SPACE SECURITY 2008, *supra* note 2, at 50, 69; see also SPACESECURITY.ORG, SPACE SECURITY 2009 ch. 3 (forthcoming 2009) (draft on file with author) [hereinafter SPACE SECURITY 2009], (reporting that, in 2008, Vietnam and Venezuela also joined the roster of countries undertaking space activities, and "Algeria, Brazil, Chile, Egypt, India, Malaysia, Nigeria, South Africa, and Thailand are all placing a priority on satellites to support social and economic development").

5. MICHAEL KREPON & CHRISTOPHER CLARY, HENRY L. STIMSON CTR., SPACE ASSURANCE OR SPACE DOMINANCE? THE CASE AGAINST WEAPONIZING SPACE 44 (2003), available at [www.stimson.org/wos/pdf/spacefront.pdf](http://www.stimson.org/wos/pdf/spacefront.pdf) (last visited June 30, 2009) (citing space policy expert James Oberg, who expected the cumulative U.S. investment in outer space to equal the value of all U.S. investment in Europe); SPACE FOUND., THE SPACE REPORT 2009: THE AUTHORITATIVE GUIDE TO GLOBAL SPACE ACTIVITY 4 (2009) (describing the global space industry as a \$257 billion business); SPACE SECURITY 2008, *supra* note 2, at 91 (estimating that global space revenues were \$143.31 billion in 2006, an increase of 23 percent over 2005 figures); cf. FUTRON CORP., SATELLITE INDUS. ASS'N, STATE OF THE SATELLITE INDUSTRY REPORT 3 (2008), available at <http://www.sia.org/files/2008SSIR.pdf> (last visited June 30, 2009) (estimating world satellite industry revenues at \$123 billion in 2007, with revenues growing an average of 11.5 percent since 2002); Frank Slijper, *From Venus to Mars: The European Union's Steps Towards the Militarisation of Space*, TRANSNAT'L INST., Nov. 2008, at 30 (reporting \$251 billion in space-derived industrial revenues globally in 2007).

6. SPACE SECURITY 2008, *supra* note 2, at 40–41; Marc Kaufman, *U.S. Finds It's Getting Crowded Out There: Dominance in Space Slips as Other Nations Step Up Efforts*, WASH. POST, July 9, 2008, at A1.

monitoring of terrorists and potential global trouble spots. During times of conflict, satellites are essential to the reconnaissance and surveillance functions and to the “command, control, and communications” operations, enabling senior officials to penetrate the “fog of war” via secure, real-time links to fielded forces. Satellite-guided “smart bombs” and remotely piloted “unmanned aerial vehicle” drones provide critical arrows in the warfighter’s quiver. In short, it is now almost impossible to imagine the U.S. military fighting a war without its satellite assets—the incessant demand for more orbiters, more communications bandwidth, and more reconnaissance demonstrates the accelerating exploitation of space as “the new high ground.”<sup>7</sup> As Army Lt. Gen. Larry J. Dodgen put it: “Today, space enables virtually everything we do.”<sup>8</sup>

Other countries, too, have devoted their resources to military communications and intelligence-gathering operations in space; at least a

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7. See Office of Sci. & Tech. Policy, Exec. Office of the President, U.S. National Space Policy (Aug. 31, 2006), at 10, available at <http://www.ostp.gov/galleries/default-file/Unclassified%20National%20Space%20Policy%20--%20FINAL.pdf> (last visited June 30, 2009) [hereinafter U.S. National Space Policy] (noting that it is now unclassified that “[t]he United States Government conducts satellite photoreconnaissance that includes a near real-time capability; overhead signals intelligence collection; and overhead measurement and signature intelligence collection”); see also KREPON & CLARY, *supra* note 5, at 10–26 (asserting that “[t]oday, space assets play a much larger role in the real-time enhancement of military operations,” and describing satellites’ contributions to military navigation, remote sensing, communications, and weaponry); JCS SPACE OPERATIONS, *supra* note 2, at II-1 (describing space mission areas); SPACE SECURITY 2008, *supra* note 2, at 112–23, 174–77 (noting that military satellites could be employed to support terrestrial combat operations, to strike space objects, or to attack earth targets from above); PAUL B. STARES, *THE MILITARIZATION OF SPACE: U.S. POLICY, 1945–1985*, at 14–18 (1985) (introducing various military applications of outer space assets); BARRY D. WATTS, *THE MILITARY USE OF SPACE: A DIAGNOSTIC ASSESSMENT* (2001) (assessing the evolving capabilities for exploitation of near-earth space for military purposes over the next twenty to twenty-five years); Theresa Hitchens, *Weapons in Space: Silver Bullet or Russian Roulette? The Policy Implications of U.S. Pursuit of Space-Based Weapons*, in *SPACE WEAPONS: ARE THEY NEEDED?* 87, 93 (John M. Logsdon & Gordon Adams eds., 2003) (reporting that U.S. Army officials repeatedly assert that the famous “left hook” maneuver undertaken at the outset of Operation Desert Storm, which relied on deceiving Iraq about Coalition intentions, could not have succeeded if Saddam Hussein had access to satellite photoreconnaissance of the sort that is commercially available today); Zhong Jing, *China and Space Security*, in *COLLECTIVE SECURITY IN SPACE: ASIAN PERSPECTIVES* 75, 78 (John M. Logsdon & James Clay Moltz eds., 2008) (arguing that “combat effectiveness can increase at least 50 to 100 percent with the application of space power”); Robert A. Ramey, *Armed Conflict on the Final Frontier: The Law of War in Space*, 48 A.F. L. REV. 1, 13–27 (2000) (inventorying satellite operations and weapons); Greg Miller, *U.S. Spies on Iraqi Army, Sources Say*, L.A. TIMES, July 2, 2008, at A1 (stating that U.S. authorities are employing space reconnaissance assets to surreptitiously monitor the activities of the Iraqi army as well as of terrorists).

8. Larry J. Dodgen, *Space: Inextricably Linked to Warfighting*, MIL. REV., Jan.–Feb. 2006, at 87. During the fighting in Kosovo, the United States military used twice as much bandwidth for satellite communications links as had been required during Operation Desert Storm; during the fighting in Afghanistan, the ratio rose to seven times as much; by the war in Iraq, it was forty-two times as much. *Id.* at 86–87.

dozen States have already undertaken to follow the trajectory charted by U.S. and Soviet rocketeers.<sup>9</sup> The competition is likely to accelerate in the future; for example, both the European Union (with its Galileo system) and Russia (via the “GLONASS array”) seek to offer independent rivals to the U.S. Global Positioning System (GPS).<sup>10</sup> China has certainly accelerated its space activities in both the military and civilian sectors.<sup>11</sup> Recently, India, which has long sustained an active civil space program, decided that it must “optimize space applications for military purposes.”<sup>12</sup> While the Japanese Diet passed legislation to remove the decades-long ban on any use of the country’s space assets for defense, Germany has commissioned its first five spy satellites and French President Nicolas Sarkozy has proposed doubling the national budget for space intelligence programs to \$1 billion.<sup>13</sup> Even international organizations and terrorist groups have sought to exploit satellite-derived data for security

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9. SPACE SECURITY 2008, *supra* note 2, at 65, 123–24, 129 (describing military space initiatives by France, Israel, India, Japan, and Canada, among other countries); Slijper, *supra* note 5, at 10 (noting the increased space activities of Brazil, South Korea, Taiwan, Israel, and Japan).

10. SPACE SECURITY 2008, *supra* note 2, at 83–84 (describing GPS, GLONASS, and Galileo, as well as a regional satellite navigation system designated Beidou, developed by China); *GPS and Its Competitors: The Status of Satellite Navigation*, STRATFOR, Jan. 29, 2009, [http://www.stratfor.com/analysis/20090128\\_gps\\_and\\_its\\_competitors\\_status\\_satellite\\_navigation](http://www.stratfor.com/analysis/20090128_gps_and_its_competitors_status_satellite_navigation) (last visited June 30, 2009).

11. U.S. DEP’T OF DEF., ANNUAL REPORT TO CONGRESS: MILITARY POWER OF THE PEOPLE’S REPUBLIC OF CHINA 3 (2008). *See generally* MARCIA S. SMITH, CONG. RESEARCH SERV., CRS REPORT FOR CONGRESS: CHINA’S SPACE PROGRAM: AN OVERVIEW (2005); Joan Johnson-Freese, *China’s Space Ambitions* (Institut Français des Relations Internationales, Proliferation Paper, 2007); Ashley J. Tellis, Carnegie Endowment for Int’l Peace, *Punching the U.S. Military’s ‘Soft Ribs’: China’s Antisatellite Weapon Test in Strategic Perspective*, June 2007, available at [http://www.carnegieendowment.org/files/pb\\_51\\_tellis\\_final.pdf](http://www.carnegieendowment.org/files/pb_51_tellis_final.pdf) (last visited July 29, 2009).

12. David R. Sands, *China, India Hasten Arms Race in Space*, WASH. TIMES, June 25, 2008, at A1. *See generally* Jessica Guiney, *India’s Space Ambitions: Headed Toward Space War?*, CTR. FOR DEF. INFO., May 2008, available at [www.cdi.org/pdfs/GuineyIndiaSpace.pdf](http://www.cdi.org/pdfs/GuineyIndiaSpace.pdf) (last visited June 30, 2009); Sharad Joshi, *India Reacts Cautiously to China’s Anti-Satellite Weapon Test*, 13 WMD INSIGHTS 13, 15 (2007) (noting that an Indian government official asserted that India also possesses an anti-satellite (ASAT) weapon but has refrained from exercising it); Randeep Ramesh, *India’s Unmanned Moon Mission May Launch Race for Lunar Landgrab*, GUARDIAN (London), Oct. 21, 2008, at 23.

13. SPACE SECURITY 2008, *supra* note 2, at 65–66 (describing significant increases in military investment in space by France and India); SPACE SECURITY 2009, *supra* note 4, at ch. 2 (stating that the French budget for satellite imaging and surveillance is “intended to double” under a new White Paper on Defense and National Security). *See generally* Yomiuri Shimbun, *Ban Lifted on Use of Space for Defense*, DAILY YOMIURI, Aug. 29, 2008, available at [http://www.fourwinds10.com/siterun\\_data/space/space\\_exploration/news.php?q=1220217912](http://www.fourwinds10.com/siterun_data/space/space_exploration/news.php?q=1220217912) (last visited July 29, 2009) (noting that Japanese basic space law was amended to allow use of space for defensive purposes); *Space Security Update No. 8*, CTR. FOR DEF. INFO., Dec. 18, 2008, available at <http://www.cdi.org/friendlyversion/printversion.cfm?documentID=4427> (last visited June 30, 2009) (stating that Germany has allocated \$445 million for synthetic-aperture radar satellites, capable of collecting images at night or during bad weather).



and other purposes.<sup>14</sup> Still, the \$25 billion per year that the Pentagon spends on space activities outstrips the rest of the world's combined defense expenditures in space.<sup>15</sup>

Notably, the military and civilian space programs are not neatly segregated. Many satellites serve both constituencies simultaneously, and others can be adapted as the needs fluctuate. During the 1999 fighting in Kosovo and the 2001 combat in Afghanistan, for example, commercial operators supplied 75–80 percent of the communications resources demanded by the Pentagon, and that reliance has continued with the contemporary fighting in Iraq. By 2006, the U.S. Department of Defense was spending over \$1 billion annually on commercial broadband satellite services. Other countries, too, have commingled their space programs, with military operations increasingly dependent on civilian or dual-capable birds. The clear trend around the world is for ever-increasing integration of military and civilian space programs and assets.<sup>16</sup>

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14. Int'l Atomic Energy Agency [IAEA], *Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic*, Report by the Director General, at 3, IAEA Doc. GOV/2008/60 (Nov. 19, 2009) (noting the IAEA's use of commercially available and other satellite imagery in assessing nuclear weapons-related activities at a site in Syria); see also SPACE SECURITY 2009, *supra* note 4, ch. 4 (stating that Human Rights Watch and Amnesty International used satellite reconnaissance to monitor activities in Darfur, Georgia, and Sri Lanka); Peter Eisler, *Google Earth Helps Yet Worries Government*, USA TODAY, Nov. 6, 2008, available at [http://www.usatoday.com/tech/news/surveillance/2008-11-06-googleearth\\_N.htm](http://www.usatoday.com/tech/news/surveillance/2008-11-06-googleearth_N.htm) (last visited June 30, 2009) (noting that terrorist groups in Yemen and Iraq have used imagery from Google Earth to plan attacks); Emily Wax, *Gunmen Used Technology as a Tactical Tool*, WASH. POST, Dec. 3, 2008, at A1 (stating that attackers used GPS satellite navigation system, satellite-enabled cellphones, and Google Earth maps in planning and executing the terrorism in Mumbai, India in November 2008).

15. SPACE SECURITY 2008, *supra* note 2, at 113 (noting that at the end of 2007, the United States had 136 operational satellites dedicated to military applications, representing over half the world's total); SPACE SECURITY 2009, *supra* note 4, at ch. 5 (reporting that by the end of 2007, the United States and the Soviet Union/Russia had launched more than 3000 military satellites between them, while the rest of the world combined had launched fewer than one hundred); Kaufman, *supra* note 6 (positing that the traditional large lead that the United States has enjoyed over other countries in space technology is eroding and that other countries are investing increasing revenues in space and accomplishing noteworthy goals). Some authorities assert that the United States now accounts for 95 percent of all global military space expenditures; see also Sarah Estabrooks, *Space Security 2006*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY 93, 99 (U.N. Inst. for Disarmament Research ed., 2006).

16. SPACE SECURITY 2008, *supra* note 2, at 105–07. See generally JOAN JOHNSON-FREESE, SPACE AS A STRATEGIC ASSET 27–50 (2007) (discussing “the conundrum of dual-use technology” in space); Joanne Irene Gabrynowicz, *Space Law: Its Cold War Origins and Challenges in the Era of Globalization*, 37 SUFFOLK U. L. REV. 1041, 1051 (2004) (discussing the “increasingly hybrid public-private environment” for space activities and the “integration of military and civil missions”); Gerard Brachet, *Leveraging the Existing UN Space Machinery for Sustainable and Secure Access to Outer Space*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY, *supra* note 15, at 107, 109 (noting the “fading distinction between civilian and military” spacecraft); Elizabeth Seebode Waldrop, *Integration of Military and Civilian Space Assets: Legal and National Security Implications*, 55 A.F. L. REV. 157

Two eternal verities within this realm are the incessant advance of technology and the irresistible dissemination of that technology to additional users. To cite one conspicuous example, the capabilities for overhead photography (an absolutely vital function for both security and commercial applications) have witnessed successive generations of revolutionary new apparatus. The ground resolution (a measure of the smallest object on the surface of the earth that a satellite can separately image) available via public sources has shrunk from eighty meters in 1972, to thirty meters in 1982, to ten meters in 1986, to five meters in 1997, to two meters in 2004, and to less than half a meter today. Beyond those increments, the even more fine-grained contemporary capacities of military intelligence satellites are classified, but are surely much more precise than the commercially available products.<sup>17</sup>

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(2004) (reporting that military “outsourcing” has led the U.S. military to rely increasingly on commercial and civilian space assets owned and operated by domestic, foreign, and international entities); Jessica West, *The Space Security Index: Changing Trends in Space Security and the Outer Space Treaty*, in *CELEBRATING THE SPACE AGE* 119, 124 (U.N. Inst. for Disarmament Research ed., 2007) (stating that the U.S. Department of Defense spent \$70 million in 2006 to procure high-resolution satellite imagery from commercial sources); Leonard David, *U.S.-China Space Ties Weighed*, SPACE.COM, Apr. 20, 2006, [http://www.space.com/news/060420\\_china\\_visit.html](http://www.space.com/news/060420_china_visit.html) (last visited June 30, 2009) (quoting space expert Joan Johnson-Freese, “there is no distinction between space technology for civil or military use, since 95 percent of space technology is dual-use, and further—and really problematic—there is often little or no distinction between military technology that is offensive or defensive in nature”); Jennifer La Fleur, *Government, Media Focus on Commercial Satellite Images*, NEWS MEDIA & L., Summer 2003, at 37 (reporting on a June 2002 memorandum from George Tenet, Director of the CIA, which stated that “[i]t is the policy of the Intelligence Community to use U.S. commercial space imagery to the greatest extent possible”); Peter Marino, *Independent Study of the Roles of Commercial Remote Sensing in the Future National System for Geospatial-Intelligence*, Report to the Directors of the National Geospatial Intelligence Agency and the National Reconnaissance Office, (July 16, 2007), available at <http://www.fas.org/irp/eprint/crs.pdf> (last visited July 17, 2009) (proposing that U.S. intelligence agencies should do even more in the future to integrate commercial satellite operations into the government’s satellite intelligence-gathering architecture).

17. SPACE SECURITY 2008, *supra* note 2, at 97, 101–02 (noting that in addition to the exquisite power of photographic satellites, additional types of sensors, including synthetic aperture radars, are providing revolutionary capabilities to commercial customers); WATTS, *supra* note 7, at 66; Waldrop, *supra* note 16, at 170–73 (“Though the imagery available from commercial systems is reportedly not yet as precise as that available from military systems, commercial high-resolution systems can now produce imagery of a quality formerly only available from military systems.”); *GeoEye’s New Satellite Offers Unprecedentedly Sharp Images*, DEF. NEWS, Oct. 20, 2008, <http://www.defensenews.com/story.php?i=3778072> (last visited June 30, 2009) (discussing new commercial satellite imaging service, capable of obtaining 0.41 meter ground resolution; U.S. government has already agreed to purchase \$197 million worth of its imagery); Sharon Weinberger, *Can You Spot the Chinese Nuclear Sub?*, DISCOVER MAG., July 21, 2008, <http://discovermagazine.com/2008/aug/21-can-you-spot-the-chinese-nuclear-sub> (last visited June 30, 2009) (“Today, with the advent of civilian satellites here and abroad, we have opened wide the window on places and events that, not so long ago, only spies could see.”); Theresa Hitchens, *Commercial Imagery: Benefits and Risks*, Presentation to Conference on U.S. Space Operations in the International Context (Feb. 24, 2004),

Governments have only limited ability to modulate these technological progressions. Regarding private U.S. remote-sensing satellites, the U.S. government retains the legal right of "shutter control," meaning that it can require the owner or operator to refrain from acquiring or disseminating images of sensitive security-related targets during wartime or crisis.<sup>18</sup> But there is no guarantee that other countries would regulate the dozen or so foreign public or private reconnaissance assets in a complementary fashion. During the fighting in Afghanistan in 2001, the United States was able to persuade the French government to prevent the relevant imagery from its SPOT consortium satellites from reaching the open market, where it could be accessed by the enemy. To negate the prospect that other suppliers might fill the gap, the Pentagon also preemptively bought up, for \$1.9 million per month, all the other possibly useful, high-resolution imagery of Afghanistan that the alternative private sources, such as Space Imaging Company's Ikonos satellite, could generate.<sup>19</sup>

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available at <http://www.cdi.org/friendlyversion/printversion.cfm?documentID=2111> (last visited June 30, 2009) (reporting that companies in seven countries have commercial imaging satellites in orbit, several already providing less than one-meter imagery).

18. See Land Remote Sensing Policy Act of 1992, 15 U.S.C. §§ 5601–5672 (2000); Licensing of Private Land Remote-Sensing Space Systems, 15 C.F.R. pt. 960 (2008); KREPON & CLARY, *supra* note 5, at 17–18 (stating that U.S. companies are subject to determinations by the Secretary of State and the Secretary of Defense that can prohibit acquisition and dissemination of satellite imagery for national security or foreign policy justifications; the power has never been invoked); U.S. Office of Sci. & Tech. Policy, Exec. Office of the President, *U.S. Commercial Remote Sensing Policy Fact Sheet* (Apr. 25, 2003), available at <http://www.au.af.mil/au/awc/awcgate/space/2003remotesensing-ostp.htm> (last visited June 30, 2009). See generally SPACE SECURITY 2008, *supra* note 2, at 97 (indicating that seven companies in Canada, France, Germany, Israel, Russia, and the United States provide commercial remote sensing imagery; global revenues from these sales totals well over \$1 billion annually); Robert A. Ramey, *Outer Space Law*, in NATIONAL SECURITY LAW 745, 777 (John Norton Moore & Robert F. Turner eds., 2d ed. 2005); Waldrop, *supra* note 16, at 205 (discussing the controversies over the wisdom and legality of the shutter control policy); La Fleur, *supra* note 16, at 37 (explaining that the Secretaries of State and Defense, acting without a court order, and not subject to appellate review, can bar distribution of satellite imagery); Hitchens, *supra* note 17 (stating that shutter control policies also apply to export licenses for U.S. satellite technology).

19. Duncan Campbell, *US Buys up all Satellite War Images*, GUARDIAN (London), Oct. 17, 2001, available at <http://www.guardian.co.uk/world/2001/oct/17/physicalsciences.afghanistan/print> (last visited June 30, 2009); David Whitehouse, *US Buys Afghan Image Rights*, BBC NEWS, Oct. 17, 2001, <http://news.bbc.co.uk/1/hi/sci/tech/1604426.stm> (last visited June 30, 2009); see also KREPON & CLARY, *supra* note 5, at 18 (citing "checkbook shutter control"); Hitchens, *supra* note 17.

## II. THE LEGAL REGIME OF OUTER SPACE

For a relatively “young” field of human endeavor, outer space has already witnessed an impressive conglomeration of international law; according to some experts, “the USA and USSR have gone further to achieve arms control in space than in any other area.”<sup>20</sup>

The foundational instrument, the 1967 Outer Space Treaty (OST)<sup>21</sup> articulates the key “constitutional” principles: the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries;<sup>22</sup> outer space shall be free for exploration and use by all States without discrimination;<sup>23</sup> outer space is not subject to national appropriation by claim of sovereignty or other means;<sup>24</sup> and States shall carry on their activities in the exploration and use of outer space in accordance with international law, including the Charter of the United Nations.<sup>25</sup>

20. JAMES CLAY MOLTZ, *THE POLITICS OF SPACE SECURITY: STRATEGIC RESTRAINT AND THE PURSUIT OF NATIONAL INTERESTS* 29 (2008) (quoting WILLIAM H. SCHAUER, *THE POLITICS OF SPACE: A COMPARISON OF THE SOVIET AND AMERICAN PROGRAMS* 71 (1976)); see also *SPACE LAW: A TREATISE*, (Francis Lyall & Paul B. Larsen eds., 2009); Michel Bourbonniere, *Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or Ius in Bello Satellitis*, 9 J. CONFLICT & SECURITY L. 43 (2004); Jonathan Dean, *The Current Legal Regime Governing the Use of Outer Space*, in *SAFEGUARDING SPACE FOR ALL: SECURITY AND PEACEFUL USES* 35 (U.N. Inst. for Disarmament Research ed., 2004); Gabrynowicz, *supra* note 16; Ramey, *supra* note 18, at 745; Thomas Graham, *The Law and the Military Use of Outer Space*, in *SAFEGUARDING SPACE FOR ALL: SECURITY AND PEACEFUL USES*, *supra*, at 87; Michael C. Mineiro, *The United States and the Legality of Outer Space Weaponization: A Proposal for Greater Transparency and a Dispute Resolution Mechanism*, 33 *ANNALS AIR & SPACE L.* 441 (2008); Christopher M. Petras, *The Debate Over the Weaponization of Space—A Military-Legal Conspectus*, 28 *ANNALS AIR & SPACE L.* 171 (2003); Dana J. St. James, *The Legality of Anti-Satellites*, 3 *B.C. INT'L & COMP. L. REV.* 467 (1980); Nina Tannenwald, *Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 *YALE J. INT'L L.* 363 (2004); Arjen Vermeer, *A Legal Exploration of Force Application in Outer Space*, 46 *MIL. L. & L. WAR REV.* 299 (2007); Rex J. Zedalis & Catherine L. Wade, *Anti-Satellite Weapons and the Outer Space Treaty of 1967*, 8 *CAL. W. INT'L L.J.* 454 (1978).

21. Outer Space Treaty, *supra* note 1. See generally DETLEV WOLTER, *COMMON SECURITY IN OUTER SPACE AND INTERNATIONAL LAW* 17–23 (2005); Michel Bourbonniere & Ricky J. Lee, *Legality of the Deployment of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict*, 18 *EUR. J. INT'L L.* 873 (2007); Nancy Gallagher, *Approaches to Regulating Weapons in Space*, in *SAFEGUARDING SPACE SECURITY: PREVENTION OF AN ARMS RACE IN OUTER SPACE* 71 (U.N. Inst. for Disarmament Research ed., 2005) [hereinafter *SAFEGUARDING SPACE SECURITY*]; Raymond L. Garthoff, *The Outer Space Treaty, 1967 to the Present*, in 2 *ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT* 877 (Richard Dean Burns ed., 1993); Jozef Goldblat, *Efforts to Control Arms in Outer Space*, 34 *SECURITY DIALOGUE* 103 (2003); Michael C. Mineiro, *FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations Under Article IX of the Outer Space Treaty*, 34 *J. SPACE L.* 321 (2008); Ramey, *supra* note 18; St. James, *supra* note 20.

22. Outer Space Treaty, *supra* note 1, art. I.

23. *Id.*

24. *Id.* art. II.

25. *Id.* art. III. The Outer Space Treaty also requires that in the exploration and use of outer space, countries “shall be guided by the principle of co-operation and mutual

In addition, the OST establishes noteworthy weapons-related restrictions. Parties undertake not to place into orbit around the earth nuclear weapons or other weapons of mass destruction, not to install such weapons on celestial bodies, and not to station them in outer space in any other manner.<sup>26</sup> This provision does not impede the stationing of non-nuclear weapons (including conventional ASAT weapons) in space,<sup>27</sup> nor does it affect a nuclear weapon that makes only a temporary *transit* of outer space, as when propelled by an intercontinental ballistic missile (ICBM) toward its target, rather than being “stationed” in space.

Likewise, the OST provides that the moon and other celestial bodies shall be used “exclusively for peaceful purposes,” and it specifies that parties may not establish military bases, test weapons, or conduct military maneuvers in those locations.<sup>28</sup> Significantly, however, the treaty bans those activities only on the moon and other celestial bodies—parties are accordingly unrestricted in building forts, testing weapons, and conducting military maneuvers on artificial satellites or in the void of space.

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assistance,” that they shall conduct their activities in space with due regard for the interests of other parties, and that if a party has reason to believe that its activities in space “would cause potentially harmful interference” with the space activities of other States, “it shall undertake appropriate international consultations.” *Id.* art. IX.

26. *Id.* art. IV.

27. It might be argued, in light of the widespread and long-lasting damage that a non-nuclear ASAT weapon might inflict on a wide swath of current and future satellites, via the creation of persistent debris, *see infra* notes 40–56 and accompanying text, that even a non-nuclear ASAT weapon should be considered to be a “weapon of mass destruction,” and therefore categorically prohibited by art. IV of the Outer Space Treaty. In view of the more common usage, however, which generally reserves the term “weapon of mass destruction” for nuclear, chemical, and biological arms, this Article does not explore this alternative legal concept in any detail.

28. Outer Space Treaty, *supra* note 1, art. IV. Some authorities have traditionally argued that the restriction to “peaceful purposes” forecloses any “military” activities whatsoever. The United States, in contrast, has argued that this language prohibits only “aggressive” behavior, and thus allows military actions that are defensive or otherwise non-aggressive in nature. Elizabeth S. Waldrop, *Weaponization of Outer Space: U.S. National Policy*, 29 ANNALS AIR & SPACE L. 329, 339–40 (2004) (claiming that the definition of “peaceful purposes” has expanded over the years as States increasingly use military space assets for non-aggressive purposes); *see also* U.S.-CHINA ECON. & SECURITY REV. COMM’N, 2008 ANNUAL REPORT TO CONGRESS 148–49 (2008) [hereinafter 2008 ANNUAL REPORT TO CONGRESS]; S. Chandrashekar, *Problems of Definition: A View of an Emerging Space Power*, in PEACEFUL AND NON-PEACEFUL USES OF OUTER SPACE: PROBLEMS OF DEFINITION FOR THE PREVENTION OF AN ARMS RACE 77–105 (Bhupendra Jasani ed., 1991) [hereinafter PEACEFUL AND NON-PEACEFUL USES OF OUTER SPACE]; Petras, *supra* note 20; Ramey, *supra* note 7, at 79–82; Slijper, *supra* note 5, at 34–35; Ivan A. Vlasic, *The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space*, in PEACEFUL AND NON-PEACEFUL USES OF OUTER SPACE, *supra*, at 37–55; Larry M. Wortzel, *The Chinese People’s Liberation Army and Space Warfare: Emerging United States-China Military Competition*, AM. ENTER. INST., Oct. 17, 2007, at 7; Zedalis & Wade, *supra* note 20, at 470–78.

Virtually all the world's spacefaring countries, and ninety-eight countries in total, are party to the OST.<sup>29</sup> The OST has also spawned a cascade of other agreements, adhered to by most of the relevant States, fleshing out important aspects of the legal regime for space, including the 1968 Rescue and Return Agreement (requiring parties to assist astronauts in distress and to return de-orbited spacecraft to their owners)<sup>30</sup> and the 1975 Registration Convention (creating procedures for a launching State to register and take responsibility for its spacecraft).<sup>31</sup> Of special note is the 1972 Liability Convention, specifying a two-tiered tort regime for injury or damage inflicted by a satellite: absolute liability for harm caused on earth or to aircraft, and liability for "fault" for injuries to other countries' space objects.<sup>32</sup>

Other treaties, too, contribute to the law of outer space. The 1963 Limited Test Ban Treaty, for example, prohibits nuclear explosions in outer space,<sup>33</sup> and several arms control treaties ban interference with satellites employed to help parties monitor compliance with the agreements' terms.<sup>34</sup>

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29. U.N. Office for Outer Space Affairs, Comm. on the Peaceful Uses of Outer Space, *United Nations Treaties and Principles on Outer Space and Related General Assembly Resolutions, Addendum, Status of International Agreements Relating to Activities in Outer Space as at 1 January 2008*, U.N. Doc. ST/SPACE/11/Rev.2/Add.1 (Jan. 1, 2008), available at [http://www.oosa.unvienna.org/pdf/publications/ST\\_SPACE\\_11\\_Rev2\\_Add1E.pdf](http://www.oosa.unvienna.org/pdf/publications/ST_SPACE_11_Rev2_Add1E.pdf) (last visited June 30, 2009).

30. Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, *opened for signature* Apr. 22, 1968, 19 U.S.T. 7570, 9574 U.N.T.S. 120. The Rescue and Return Agreement has 92 parties, including the United States, Russia, and China. U.N. Office of Outer Space, Treaty Signatures: Rescue Agreement, <http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do> (last visited June 30, 2009).

31. Convention on the Registration of Objects Launched into Outer Space, Jan. 14, 1975, 29 U.S.T. 695, 1023 U.N.T.S. 15. The Registration Convention has 53 parties, including the United States, Russia, and China. U.N. Office of Outer Space, Treaty Signatures: Registration Convention, <http://www.oosa.unvienna.org/oosatdb/showTreatySignatures.do> (last visited June 30, 2009).

32. Convention on International Liability for Damage Caused by Space Objects arts. III–IV, *opened for signature* Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187. The Liability Convention has 86 parties, including the United States, Russia, and China. Ramey argues that the Liability Convention's mechanisms for assessing financial responsibility for damage have never been implemented in practice; the nearest example, when the Soviet Union paid compensation to Canada after the Cosmos 954 satellite crashed into Canadian territory in 1978, was not formally conducted under the treaty's terms. *See* Ramey, *supra* note 7, at 91.

33. Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water art. I(1)(a), Aug. 5, 1963, 14 U.S.T. 1313, 480 U.N.T.S. 43. The Limited Test Ban Treaty has 108 parties, including the United States, Russia, and China.

34. *See, e.g.*, Treaty on the Limitation of Anti-Ballistic Missile Systems art. XII, U.S.-U.S.S.R., May 26, 1972, 23 U.S.T. 3435, T.I.A.S. No. 7503 (no longer in force); Treaty on the Elimination of Their Intermediate-Range and Shorter-Range Missiles art. XII, U.S.-U.S.S.R., Dec. 8, 1987, 1657 U.N.T.S. 2; Treaty on Conventional Armed Forces in Europe art. XV, Nov. 19, 1990, S. TREATY DOC. NO. 102-8 (1991), 30 I.L.M. 1; SPACE SECURITY 2008, *supra* note 2, at 53 (noting space-related arms control agreements).

## III. THE EMERGING ASAT THREAT

As countries increasingly exploit and prosper from outer space for military and civilian purposes, it should come as no surprise that their rivals and potential enemies increasingly ponder mechanisms to deny and defeat those applications in time of conflict. Indeed, the more that countries invest in satellites, the more they become dependent on them, and the greater the payoff for a hostile force that can disrupt their functions—and the greater the risk that an initial ASAT attack would trigger retaliation, cascading into general war. As the United States and others put more and more eggs into the basket of outer space, we all become nervously vulnerable to hostile efforts that would challenge the growing reliance.<sup>35</sup>

And satellites make excellent targets. They are still relatively few in number (so destroying or damaging even a handful could have a major impact); they are “soft” (lacking heavy shielding or the ability to defend themselves from attack); they usually follow known, predictable orbital paths, with little ability to undertake evasive maneuvers (so they are easily trackable “sitting ducks”); they are usually not equipped with onboard sensors that could provide local “situational awareness” (so they might not even realize they had been attacked, or by whom); and they are expensive (so States and private corporations do not maintain standby fleets of spares, to rapidly reconstitute a satellite architecture that was suddenly degraded by hostile action).<sup>36</sup>

Accordingly, the leading spacefaring countries began to pursue ASAT weapons almost as soon as they developed their interest in satellites themselves—for the United States, the first ASAT program, an

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35. See Marc Kaufman & Walter Pincus, *Effort to Shoot Down Satellite Could Inform Military Strategy*, WASH. POST, Feb. 20, 2008, at A3 (quoting Thomas Fingar, Deputy Director of National Intelligence for Analysis, as stating: “It would not be that difficult to inflict significant, serious damage to our capabilities over [a] couple of days with ASAT weapons”); Paul Tighe & Takashi Hirokawa, *Japan, Australia Ask China to Explain Space Missile*, BLOOMBERG, Jan. 19, 2007, <http://www.bloomberg.com/apps/news?pid=20601087&sid=aQSEcxOJNoPI&refer=home> (last visited June 30, 2009) (quoting Rep. Edward Markey (D-Mass.) as saying, “American satellites are the soft underbelly of our national security”).

36. SPACE SECURITY 2008, *supra* note 2, at 140, 147 (noting the difficulties in detecting an ASAT attack and characterizing it as such, and concluding that “if an actor has the ability to overcome these natural defenses [i.e., the speed and distance involved in engaging satellite targets], there are few options for physically protecting a satellite against a direct attack”); Theresa Hitchens & David Chen, *Forging a Sino-US “Grand Bargain” in Space*, 24 SPACE POL’Y 128 (2008), available at <http://www.cdi.org/pdfs/HitchensGrandBargain.pdf> (last visited July 2, 2009) (describing steps that would have to be taken to ensure greater survivability for U.S. satellites); see also KREPON & CLARY, *supra* note 5, at 24, 68 (describing mechanisms for threatening and defending satellites).

initial Army feasibility study, was completed within six weeks of the Soviet Union's first Sputnik orbit in 1957.<sup>37</sup>

Two basic varieties of ASAT mechanisms have flourished over the years. The first is "kinetic energy" interceptors, relying on a physical object that suddenly shoots up from earth and either collides with the target satellite, destroying it via high-speed impact, or approaches closely enough to blow up both itself and the target via a suicidal explosion.

The alternative ASAT technology relies instead on "directed energy," such as a laser beam, a column of sub-atomic particles, radio-frequency transmissions, or a microwave generator. These gizmos could burn a fatal hole in the satellite's skin, temporarily and reversibly (or permanently) blind its sensors, or possibly employ cyber warfare to alter the satellite's on-board computers, switching it off or even commandeering it for the attacker's own uses.<sup>38</sup>

Either of these concepts, in principle, would work; without understating the technical and fiscal difficulties that would have to be overcome to weaponize either ASAT for practical applications, there is nothing in the physics of either device that would impose insurmountable barriers to a determined weaponeer. Either mechanism could be based on the surface of the earth, on an airplane, or on a "killer satellite" in space. However, cost and vulnerability are serious impediments, and designers at present have not been successful at developing power sources, optics, and other equipment that could adequately miniaturize high-energy lasers or other directed energy systems for applications in aircraft or spacecraft.<sup>39</sup>

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37. See STARES, *supra* note 7, at 49 (noting that the U.S. Army feasibility study of satellite interceptors began in June 1957 and was ready with recommendations by November 1957, six weeks after Sputnik).

38. WOLTER, *supra* note 21, at 32–35; Bhupendra Jasani, *Introduction to PEACEFUL AND NON-PEACEFUL USES OF OUTER SPACE*, *supra* note 28, at 1, 10–13.

39. See SPACE SECURITY 2008, *supra* note 2, at 164, 166–67, 184 (discussing the progress and frustrations of the Airborne Laser Program and noting that "serious technology challenges" remain); William Spacy, II, *Assessing the Military Utility of Space-Based Weapons*, in SPACE WEAPONS: ARE THEY NEEDED?, *supra* note 7, at 121, 126, 148. See generally CHRISTOPHER BOLKCOM & STEVEN A. HILDRETH, CONG. RESEARCH SERV., CRS REPORT FOR CONGRESS: AIRBORNE LASER (ABL) – ISSUES FOR CONGRESS (2007); STEVEN M. KOSIAK, CTR. FOR STRATEGIC & BUDGETARY ASSESSMENTS, ARMING THE HEAVENS: A PRELIMINARY ASSESSMENT OF THE POTENTIAL COST AND COST-EFFECTIVENESS OF SPACE-BASED WEAPONS (2007) (evaluating the array of possible ASAT mechanisms); Matthew Mowthorpe, *The Revolution in Military Affairs and Directed Energy Weapons*, AIR & SPACE POWER CHRON., Mar. 8, 2002, available at <http://www.iwar.org.uk/rma/resources/energy-weapons/mowthorpe02.html> (last visited June 30, 2009).



### A. The Hazards of Debris

One special feature that differentiates between the kinetic and directed energy ASATs is the creation of space debris. When the interceptor rams into or detonates against its target, both spacecraft fragment into thousands of pieces; in contrast, a laser or particle beam weapon would usually not compromise the gross physical integrity of its target, but would leave it intact, if dysfunctional.

This distinction is critical, both legally and factually. Space debris is now increasingly recognized as a profound problem for current and future safe and successful operations in space.<sup>40</sup> Traveling at enormous orbital velocities (30,000 km/hr in low orbit), a chunk of random debris could obliterate an unlucky satellite; even small fragments could cause catastrophic damage. An orbiting particle a mere one centimeter in diameter (about the size of a child's marble) carries the impact of a one-ton safe falling from the top of a five-story building, and is capable of inflicting serious, perhaps fatal, harm.<sup>41</sup> To cite another vivid illustration: the windows of the Space Shuttle, designed to withstand the enormous pressures of re-entry into the earth's atmosphere, have repeatedly been pockmarked by collisions with tiny flecks of dried paint and other minor objects, traveling at ten times the speed of a high-powered bullet.<sup>42</sup>

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40. SPACE SECURITY 2008, *supra* note 2, at 25–38. See generally Michael W. Taylor, *Trashing the Solar System One Planet at a Time: Earth's Orbital Debris Problem*, 20 GEO. INT'L ENVTL. L. REV. 1 (2007); Christopher D. Williams, *Space: The Cluttered Frontier*, 60 J. AIR L. & COM. 1139 (1995); David Wright, *Orbital Debris Produced by Kinetic-Energy Anti-Satellite Weapons*, in CELEBRATING THE SPACE AGE, *supra* note 16, at 155; U.N. Office for Outer Space Affairs, Comm. on the Peaceful Uses of Outer Space, Sci. & Tech. Subcomm., *Technical Report on Space Debris*, U.N. Doc. A/AC.105/720 (1999), available at [http://www.oosa.unvienna.org/pdf/reports/ac105/AC105\\_720E.pdf](http://www.oosa.unvienna.org/pdf/reports/ac105/AC105_720E.pdf) (last visited June 30, 2009); Leonard David, *The Clutter Above*, BULL. ATOMIC SCIENTISTS, July–Aug. 2005, at 32; NAT'L SCI. & TECH. COUNCIL, INTERAGENCY REPORT ON ORBITAL DEBRIS (1995).

The problems of space debris, and the awareness of its dangers, are not new. By the mid-1960s, NASA considered orbital debris to be a major threat to the space environment, and the concern intensified in the subsequent decades as ASAT testing proceeded. However, an international political consensus about how to deal with the growing danger was much slower to coalesce. MOLTZ, *supra* note 20, at 126, 177; Maureen Williams, *Safeguarding Outer Space: On the Road to Debris Mitigation*, in NEXT GENERATION, *supra* note \*, at 81 (tracing landmarks in the global attention to the problem of space debris); see also NICHOLAS L. JOHNSON ET AL., NASA, HISTORY OF ON-ORBIT SATELLITE FRAGMENTATIONS (14th ed. 2008).

41. *Space Security or Space Weapons? A Guide to the Issues*, HENRY L. STIMSON CTR., Jan. 2005, at 8, available at <http://www.stimson.org/space/pdf/issueguide.pdf> (last visited June 30, 2009).

42. Brad Lemley, *The Shooting Gallery*, DISCOVER MAG., Jan. 12, 2001, <http://discovermagazine.com/2001/dec/featshoot> (last visited June 30, 2009) (claiming that debris creates an average of thirty-two pits on the shuttle's windows on each mission, leading to frequent replacements, and that 17 percent of the damage has been inflicted by paint fragments); NASA Orbital Debris Program Office, *Orbital Debris Surface Examinations*, <http://orbitaldebris.jsc.nasa.gov/measure/surfaceexam.html> (last visited June 30, 2009) (stating

Debris from an ASAT test or attack would generate thousands of these random fragments, dispersing into a lethal orbiting cloud. China's January 2007 ASAT experiment, for example (described below), erupted into a miasma of 2600 pieces of trackable debris, and perhaps 150,000 smaller (but nonetheless hazardous) fragments careening in all directions. It created a swarm, moving through space like a high-speed lethal amoeba, stretching from 200 to 2350 kilometers in altitude, through which over 100 essential earth observation satellites must repeatedly pass in the years to come. Already, two U.S. satellites have been compelled to alter their normal orbital courses to avoid this danger zone.<sup>43</sup>

Moreover, the location, density, and direction of the debris cloud are difficult to discern with sufficient specificity to guide evasive maneuvers. The U.S. Air Force Space Command, located at Cheyenne Mountain in Colorado, maintains the most advanced mechanism for cataloguing this space detritus. This Space Surveillance Network utilizes thirty advanced sensors worldwide to track 17,300 orbiting items larger than ten centimeters, including all manner of junk cast off by earlier space missions. Experts estimate that there may be 300,000 additional orbiting fragments between one and ten centimeters in size, and perhaps 35 million bits of scrap in total—a careening inventory of three to five million kilograms of unwanted human-created space trash.<sup>44</sup>

Worse yet, much of the space debris is remarkably persistent. Altitude is the key variable here: debris generated at relatively low altitudes will usually degrade quite quickly, falling out of orbit and ordinarily burning up when re-entering the earth's atmosphere. But debris at higher altitudes can remain aloft for years, decades, or even centuries—the exoatmospheric environment has very little ability to cleanse itself, and

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that on average, two windows of the space shuttle must be replaced per mission, due to damage caused by micrometeoroids or orbital debris).

43. SHIRLEY KAN, CONG. RESEARCH SERV., CRS REPORT FOR CONGRESS: CHINA'S ANTI-SATELLITE WEAPON TEST (2007); JOHNSON ET AL., *supra* note 40, at 1 (stating that this single event contributed 17 percent of the total catalogued debris in orbit); SPACE SECURITY 2008, *supra* note 2, at 29; *Chinese Anti-Satellite Test Creates Most Severe Orbital Debris Cloud in History*, ORBITAL DEBRIS Q. NEWS (NASA), Apr. 2007, at 2; *U.S. Satellites Dodge Chinese Missile Debris*, WASH. TIMES, Jan. 11, 2008, at A1; T.S. Kelso, Analysis of the 2007 Chinese ASAT Test and the Impact of its Debris on the Space Environment, Presentation at the 2007 AMOS Conference, <http://celestrak.com/publications/AMOS/2007/AMOS-2007.pdf> (last visited June 30, 2009).

44. SPACE SECURITY 2008, *supra* note 2, at 27 (stating that 13,000 of the objects tracked by the Space Surveillance Network are recorded on the publicly accessible catalog <http://www.space-track.org>; suggesting, however, that there may be billions of pieces of human-created debris too small to identify and track); J.C. Liou & N.L. Johnson, *Risks in Space from Orbiting Debris*, 311 SCI. 340, 340 (2006) (estimating that there are 5 million kilograms of human-made debris in space); see also SPACE SECURITY 2009, *supra* note 4, ch. 1 (noting that Russia also maintains a space surveillance system, and that independent monitoring capabilities are being pursued by the European Union, Canada, China, Japan, and others).

human beings cannot yet play the janitorial role effectively. In the highest orbits, we have to think of each piece of debris as essentially a permanent problem.<sup>45</sup>

For much of this debris, especially the smaller bits, identification of the source is impossible; neither the satellite itself nor its ground controllers will be reliably able to identify the nature and origin of the particle that hit and crippled it. Lacking better situational awareness, satellite owners and operators may be ignorant about the cause of a particular malfunction—was it an internal snafu, a collision with a micrometeorite, an accidental impact with random debris, or a deliberate ASAT attack—and attribution of liability for any damage could not be readily assigned.<sup>46</sup>

Collisions with space junk have already exacted a toll. In July 1996, the French military reconnaissance satellite *Cerise* collided with a briefcase-sized fragment from an Ariane rocket launched ten years earlier. (It was just coincidental that both items were of French origin.) The collision tore off a four-meter section of the satellite's stabilization boom, sending *Cerise* wobbling out of its normal orbit. If the satellite had been manned, the accident might have proven fatal, but after some delay, ground controllers were able to reorient the satellite and continue its mission—and the severed boom became just another piece of orbital junk.<sup>47</sup> At a less catastrophic level, a tiny piece of space debris of unknown origin ripped a three-fourths inch hole entirely through the antenna dish of the Hubble Space Telescope.<sup>48</sup>

More recently—and spectacularly—on February 10, 2009, a fully operational U.S. commercial communications satellite (*Iridium-33*, launched in 1997) was blindsided by a long-defunct, but still-intact, Russian *Cosmos 2251* (launched in 1993). The impact, occurring at 22,000 miles per hour, some 490 miles above Eastern Siberia, shattered both

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45. SPACE SECURITY 2008, *supra* note 2, at 25 (noting that 300 pieces of debris from Soviet ASAT tests during the 1970s and 1980s are still in orbit today); Kelso, *supra* note 43, at 329 (predicting that 79 percent of the debris created by the 2007 Chinese ASAT test will still be in orbit one hundred years after the event); see also Michael Krepon & Michael Katz-Hyman, *Space Weapons and Proliferation*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY, *supra* note 15, at 39, 41 (noting that when naval battles occur, the wreckage sinks to the bottom of the ocean, not posing any additional hazards to maritime traffic, but when ASAT weapons are used, the debris can remain in orbit for long periods, disrupting normal satellite activities).

46. Williams, *supra* note 40, at 1158–59 (discussing the difficulties of enforcement of the Liability Convention's program of tort liability for damage to space objects).

47. David Wright, *Space Debris*, PHYSICS TODAY, Oct. 2007, at 35, 37, available at [http://ptonline.aip.org/journals/doc/PHTOAD-ft/vol\\_60/iss\\_10/35\\_1.shtml](http://ptonline.aip.org/journals/doc/PHTOAD-ft/vol_60/iss_10/35_1.shtml) (last visited June 30, 2009); Lemley, *supra* note 42.

48. SPACE SECURITY 2008, *supra* note 2, at 28; Orbital Debris Surface Examinations, *supra* note 42.

orbiters, but analysts are not yet able to discern precisely how many fragments—and of what size and trajectory—resulted. Nicholas L. Johnson, NASA's chief scientist for orbital debris, opined that "nothing to this extent" had ever occurred before—but commentators guaranteed that it would not be the last such event. Observers had been routinely tracking both satellites, and a near-pass was certainly foreseeable, but no warning had been issued about the imminent catastrophe. As if to make matters worse, many others in the family of Iridium spacecraft are deliberately placed into similar orbits, as are multiple other types of valuable orbiters, so the debris from this sudden impact poses an especially problematic hazard.<sup>49</sup>

At least three other inactive satellites have also collided with space debris: in 1991 the defunct Russian Cosmos 1934 satellite was struck by fragments from another Cosmos orbiter; in 1997 the U.S. NOAA-7 was smacked by an unidentified chunk; and a similar impact befell the inactive Russian Cosmos 539 in 2002. Additional debris-to-debris impacts, such as the January 2005 run-in between a fragment of a Chinese rocket body and a thirty-one-year-old U.S. rocket body, are also known. Moreover, several other incidents—satellite breakups or malfunctions of uncertain cause—may have been attributable to impacts with debris particles too small to track. Unintended, but potentially catastrophic, "close approaches" (defined as satellites weaving within one kilometer of each other) occur hundreds of times daily.<sup>50</sup>

As Brian Lemley engagingly puts it, "every craft sent into orbit gets whacked repeatedly" by tiny flakes of debris or micrometeorites,<sup>51</sup> and more telling impacts are likely, too. An average small satellite in a common near-earth orbit now has a one percent chance per year of colliding with a piece of space debris so significant as to cause permanent mission failure; the betting odds on the space shuttle being seriously jeopardized by human-made debris range between one in fifty and one in 200.<sup>52</sup> By

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49. Geoff Brumfiel, *Kaputnik Chaos Could Kill Hubble*, 475 NATURE 940 (2009); William J. Broad, *Debris Spews into Space After Satellites Collide*, N.Y. TIMES, Feb. 12, 2009, at A28; Tim Hopher, *Scientists Aware Satellite Paths Would Be Close*, REUTERS, Feb. 12, 2009, <http://www.reuters.com/article/latestCrisis/idUSLC844164> (last visited June 30, 2009); Tariq Malik, *Debris from Space Collision Poses Threat to Other Satellites*, SPACE.COM, Feb. 13, 2009, <http://www.space.com/news/090212-satellite-collision-update.html> (last visited June 30, 2009).

50. See generally Lemley, *supra* note 42; Liou & Johnson, *supra* note 44; Wright, *supra* note 47; Yuri Zaitsev, *The Problem of Space Junk*, RIA NOVOSTI, Feb. 13, 2009, <http://en.rian.ru/analysis/20090213/120123116.html> (last visited July 19, 2009).

51. See generally Lemley, *supra* note 42.

52. SPACE SECURITY 2008, *supra* note 2, at 28 (stating that collisions between the large space assets and small pieces of debris are "a daily but manageable problem," and noting that one large satellite sustained 30,000 hits by debris or meteoroids during its six years in orbit); Wright, *supra* note 47; Joel Primack, *Pelted by Paint, Downed by Debris*, BULL. ATOMIC

one estimate, we should now anticipate a major collision in space (resulting in significant damage to the satellite) every three to four years, and a catastrophic crash (resulting in complete fragmentation of the unlucky victim) every twelve to fourteen years.<sup>53</sup>

In the most recent scary near-miss, three astronauts were forced on March 13, 2009 to temporarily evacuate the International Space Station, seeking refuge in the attached Russian Soyuz spacecraft that serves as their emergency escape option, due to an unanticipated “conjunction” with a wandering five-inch motor component. The fragment, which has been circling the earth since 1993, follows an erratic orbit; ground controllers were not certain how closely it would approach on that particular pass.<sup>54</sup> Two weeks later, nervous NASA officials ordered astronauts aboard the space shuttle Discovery, which had docked with the Space Station, to fire the ship’s thrusters briefly, in order to maneuver away from an oncoming, potentially lethal four-inch piece of an old Chinese rocket body that was slated to swing uncomfortably nearby.<sup>55</sup>

Outer space is, of course, a very large place, with lots of room for satellites to roam and avoid each other. But not all regions of space are equally valuable, and in the most useful orbits, the traffic gets congested. Naturally, debris (from prior ASAT tests and from ordinary launch activity) is most prevalent—and most problematic—in those regions. The specter of debris-to-debris collisions, multiplying in a hazardous “chain reaction” is the worst, but all too realistic, scenario.<sup>56</sup>

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SCIENTISTS, Sept.-Oct. 2002, at 24. See generally Lemley, *supra* note 42 (quoting NASA official as estimating that there is a one-in-twenty chance over ten years that the International Space Station will suffer a collision resulting in loss of a critical component that could lead to death or injury of the astronauts); *ISS Orbit Adjusted to Dodge Space Junk—Mission Control*, RIA NOVOSTI, Aug. 28, 2008, [http://www.space-travel.com/reports/ISS\\_Orbit\\_Adjusted\\_To\\_Dodge\\_Space\\_Junk\\_999.html](http://www.space-travel.com/reports/ISS_Orbit_Adjusted_To_Dodge_Space_Junk_999.html) (last visited June 30, 2009) (stating that the International Space Station’s orbit was lowered 1.7 kilometers in order to avoid collision with space debris). But see SPACE SECURITY 2008, *supra* note 2, at 28 (reporting a 1995 National Research Council study that estimated only a one-in-a-thousand chance of a satellite colliding with a large piece of debris over a decade).

53. Wright, *supra* note 47, at 37.

54. Joel Achenbach, *Astronauts Evacuate Space Station Temporarily During Collision Scare*, WASH. POST, Mar. 13, 2009, at A2.

55. *Space Station, Shuttle Dodge Old Rocket Debris*, WASH. POST, Mar. 23, 2009, at A2.

56. The possibility of a “super-critical” chain reaction, in which random collisions generate new debris faster than old debris falls out of orbit, is referred to as the “Kessler syndrome,” after the scientist who first described it. Debris in some sectors of space is already sufficiently concentrated that these chain reactions are possible. Liou & Johnson, *supra* note 44; Williams, *supra* note 40, at 1145–46; Wright, *supra* note 47, at 37–38.

James Clay Moltz has imaginatively likened the problem of persistent orbital debris to the more familiar problem of unexploded ordnance on the conventional battlefield, which frequently causes harm to unwary civilians long after the war has terminated. “One can only imagine, for example, the different outcome . . . if—as with orbital space debris—all of the

In recognition of the folly of perpetuating these self-inflicted wounds, the United States and others have undertaken efforts to reduce their creation of additional space debris. Mitigation guidelines, both national and international, have been promulgated and generally well respected—but these merely slow, not stop or reverse, the accumulation of the problem.<sup>57</sup> The cumulative quantity of space debris grew by 5.5 percent in 2006 (with most of the additional increment being injected into orbit by the United States) and by a whopping 20.12 percent in 2007 (prompted by the Chinese ASAT test and by the spontaneous breakup of several large obsolete rocket bodies).<sup>58</sup> In 2008, a further 2.2 percent increase was registered.<sup>59</sup>

In further acknowledgement of the foolishness of fouling our own nest, the U.S. government has promulgated regulations for minimizing the creation of new orbital debris<sup>60</sup> and the commercial space industry

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arrows and bullets fired in those wars of conquest had continued to speed around the Earth causing damage for decades after they had been fired.” MOLTZ, *supra* note 20, at 17.

57. The Inter-Agency Space Debris Coordination Committee adopted a set of guidelines by consensus in 2002. See INTER-AGENCY SPACE DEBRIS COORDINATION COMM., IADC SPACE DEBRIS MITIGATION GUIDELINES (2002), available at [http://www.iadc-online.org/docs\\_pub/IADC-101502.Mit.Guidelines.pdf](http://www.iadc-online.org/docs_pub/IADC-101502.Mit.Guidelines.pdf) (last visited June 30, 2009). The U.N. Committee on the Peaceful Uses of Outer Space used the IADC guidelines as the basis for its own mitigation guidelines in 2007. See *United Nations Adopts Space Debris Mitigation Guidelines*, ORBITAL DEBRIS Q. NEWS, Apr. 2007, at 1, available at <http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv11i2.pdf>; see also Waldrop, *supra* note 16, at 212 (discussing the fact that NASA and the U.S. Department of Defense have made efforts since 1984 to reduce debris, and the United States has made debris reduction an important objective in its space policy, while the U.N. General Assembly (UNGA) has meanwhile recommended that States devote more attention to the problem.); G.A. Res. 57/116, U.N. Doc. A/RES/57/116 (Feb. 26, 2003); G.A. Res. 62/217, U.N. Doc. A/RES/62/217 (Feb. 1, 2008); SPACE SECURITY 2008, *supra* note 2, at 32–34; Nandasiri Jasentuliyana, *Space Debris and International Law*, in SPACE LAW, *supra* note 20, at 309; Yang Junhua, *Developing Space Peacefully for the Benefit of Humanity*, in COLLECTIVE SECURITY IN SPACE: ASIAN PERSPECTIVES, *supra* note 7, at 24 (discussing China’s support for efforts to reduce space debris); Martha Mejia-Kaiser, *Informal Regulations and Practices in the Field of Space Debris Mitigation*, 34 AIR & SPACE L. 21 (2009); Vladlen S. Vereshchetin, *Outer Space*, in MAX PLANCK, ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW ¶¶ 18–28 (2009), available at <http://www.mpopil.com/> (discussing international efforts to mitigate creation of space debris) (last visited July 29, 2009).

58. SPACE SECURITY 2008, *supra* note 2, at 30–31; Jessica West, *Next Generation Space Security Challenges*, in NEXT GENERATION, *supra* note \*, at 35.

59. SPACE SECURITY 2009, *supra* note 4, ch. 2.

60. U.S. National Space Policy, *supra* note 7, at 9 (stating as official U.S. policy that “[o]rbital debris poses a risk to continued reliable use of space-based services and operations and to the safety of persons and property in space and on Earth. The United States shall seek to minimize the creation of orbital debris by government and non-government operations in space in order to preserve the space environment for future generations. . . . The United States shall take a leadership role in international fora to encourage foreign nations and international organizations to adopt policies and practices aimed at debris minimization and shall cooperate in the exchange of information on debris research and the identification of improved debris mitigation practices.”). See generally NASA, HANDBOOK FOR LIMITING ORBITAL DEBRIS

has begun to speak out against weapons tests and other programs that could unnecessarily litter space with hazardous debris.<sup>61</sup> Likewise, the U.S. military has also largely turned its attention away from kinetic energy interceptors toward directed energy systems that generate little or no debris; Department of Defense policy now favors satellite negation techniques that “have temporary, localized, and reversible effects.”<sup>62</sup> Air Force Undersecretary for Space Programs Gary Payton rejected kinetic kill space weapons, stating that “[i]t would be hugely disadvantageous for the U.S. to get into that game.”<sup>63</sup>

### B. *The Historical Pattern of ASAT Development*

Throughout the Cold War era, both the United States and the Soviet Union demonstrated creativity, persistence, and open checkbooks in pursuit of diverse ASAT weapon systems. In the earliest iterations, even nuclear weapons were contemplated for deployment in the kinetic interceptors. The U.S. Army, in its Program 505, undertook a dozen ASAT system flight tests with Nike-Zeus missiles between 1962 and 1966; the Air Force’s corresponding Program 437, employing larger Thor missiles, was tested sixteen times between 1964 and 1970. All told, the United States conducted thirty-one ASAT tests in space between 1959 and 1970.<sup>64</sup>

Employing 300 kilograms of conventional high explosive, instead of nuclear warheads, the Soviet Union’s ASAT was tested in space approximately twenty times (about half of them successful) between 1968

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(2008); NASA, PROCEDURAL REQUIREMENTS FOR LIMITING ORBITAL DEBRIS (2008); NASA, TECHNICAL STANDARD, PROCESS FOR LIMITING ORBITAL DEBRIS (2007).

61. MOLTZ, *supra* note 20, at 297 (quoting industry group spokespersons as asserting that “[a]n ASAT weapons race will have the effect of increasing the financial risk of any satellite program, and this will undoubtedly be felt most within the commercial market through decreased investor confidence and (or) high insurance rates”).

62. See U.S. DEP’T OF DEF., BUDGET JUSTIFICATION: SPACE CONTROL TECHNOLOGY, FISCAL YEAR 2004/2005 (Feb. 2004), available at <http://www.dtic.mil/descriptivesum/Y2005/AirForce/0603438F.pdf> (last visited June 30, 2009). The United States has not totally abandoned kinetic energy ASAT systems: the KE-ASAT program was funded through 2005, and in 2008, when the failing USA-193 satellite posed a danger, an interceptor, rather than any directed energy system, was employed to attack it. See *infra* note 71.

63. MOLTZ, *supra* note 20, at 295.

64. LAURA GREGO, UNION OF CONCERNED SCIENTISTS, SHORT HISTORY OF US AND SOVIET ASAT PROGRAMS (Apr. 1, 2003), available at [http://www.ucsusa.org/assets/documents/nwgs/asat\\_history.pdf](http://www.ucsusa.org/assets/documents/nwgs/asat_history.pdf) (last visited July 19, 2009); STARES, *supra* note 7, at 106–34, 261; John Pike & Eric Stambler, *Anti-Satellite Weapons and Arms Control*, in 2 ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT, *supra* note 21, at 991; St. James, *supra* note 20; Desmond Ball, *Austral Special Report: Assessing China’s ASAT Program*, Nautilus Inst. (June 2007), <http://nautilus.rmit.edu.au/forum-reports/0714s-ball>; Joan Johnson-Freese, *The Viability of U.S. Anti-Satellite (ASAT) Policy: Moving Toward Space Control*, U.S. Air Force Inst. for Nat’l Sec. Stud., Occasional Paper 30 (2000), available at <http://www.usafa.af.mil/df/inss/OCP/ocp30.pdf> (last visited July 17, 2009).

and 1971 and, after a unilateral moratorium, between 1976 and 1982. The system was initially capable of reaching targets between 230 and 1000 kilometers above earth; eventually, the range was extended to between 160 to 1600 kilometers. The United States thereafter deemed the weapon to be in “operational” status, but it has been dormant for more than two decades, and the capability has presumably atrophied.<sup>65</sup>

However, in 2009, in view of the apparent renaissance in interest in ASAT activities in both the United States and China, Russia’s Deputy Defense Minister Valentin Popovkin commented, “[w]e can’t sit back and quietly watch others doing that; such work is being conducted in Russia.”<sup>66</sup>

During the 1980s, the United States pursued a rather different non-nuclear ASAT concept, the Miniature Homing Vehicle (MHV). It relied on collision, rather than explosion, and consisted of a small missile launched by a steeply climbing F-15 jet aircraft, rather than a ground-based rocket. The Air Force tested the MHV in space only three times—twice in 1984 against an unoccupied designated point in space, and once, on September 13, 1985, against an obsolescent Solwind solar observation satellite. That collision, occurring at 24,000 km/hr at 555 kilometers above the earth, shattered the target, generating 300 pieces of trackable debris, which took nineteen years to degrade out of orbit.<sup>67</sup> Some of that hazardous space junk whizzed within one mile of the International Space Station.<sup>68</sup>

The MHV program was abandoned in 1987, but the Army and Congressional ASAT enthusiasts persisted in pouring \$350 million into a more sophisticated follow-on model, designated KE-ASAT (for kinetic energy anti-satellite) in the 1990s and through 2005.<sup>69</sup> The notion here

65. GREGO, *supra* note 64; STARES, *supra* note 7, at 135–56, 262; James Clay Moltz, *Protecting Safe Access to Space: Lessons from the First 50 Years of Space Security*, 23 SPACE POL’Y 199 (2007); Pike & Stambler, *supra* note 64, at 994; St. James, *supra* note 20; *Chinese Anti-satellite Test Creates Most Severe Orbital Debris Cloud in History*, *supra* note 43, at 2, 3 (stating that 301 identifiable pieces of debris from Soviet ASAT tests still remain in orbit); Ball, *supra* note 64; Anatoly Zak, *Military: IS Anti-Satellite System*, <http://www.russianspaceweb.com/is.html> (last visited June 30, 2009); .

66. *Russia Pursuing Antisatellite Capability*, GLOBAL SECURITY NEWSWIRE, Mar. 6, 2009, available at [http://gsn.nti.org/gsn/nw\\_20090306\\_1789.php](http://gsn.nti.org/gsn/nw_20090306_1789.php) (last visited June 30, 2009).

67. Krepon & Katz-Hyman, *supra* note 45, at 41–42; Wright, *supra* note 47, at 36; Michael Krepon & Samuel Black, *Space Security or Anti-Satellite Weapons?* (Stimson Ctr., Report, May 2009). See generally Johnson-Freese, *supra* note 64. The satellite destroyed in this test was roughly the same mass (one ton) as the satellite destroyed in China’s 2007 ASAT test, but because the Chinese event occurred at a higher altitude (850 km instead of 550 km) the debris from the later collision will linger in orbit for decades longer. Wright, *supra* note 47, at 39.

68. Krepon & Katz-Hyman, *supra* note 45, at 42.

69. GREGO, *supra* note 64, at 4–5; George C. Wilson, *Mr. Smith’s Crusade*, 33 NAT’L J. 2542, 2542 (2001).



was that a Minuteman ICBM booster would project the spacecraft into a rendezvous with its target, and the impact would occur with a giant mylar flyswatter attachment, designed to damage or destroy the target, but without generating so much collateral debris.<sup>70</sup> Three models of the KE-ASAT were built, but none was ever flown, and two of the prototypes have reportedly been cannibalized for other projects.<sup>71</sup>

The most recent incarnation of a kinetic satellite-killer was demonstrated on February 20, 2008, when the U.S. Navy modified a standard ballistic missile interceptor to enable it to attack the failing USA-193 satellite, which was about to tumble out of orbit. This adaptation (which also demonstrated the significant inherent overlap between anti-missile and ASAT capabilities<sup>72</sup>) succeeded in pulverizing the satellite at very low altitude (approximately 150 miles), so most of the 3000 or so potentially hazardous fragments precipitated out of orbit within a few days or weeks, not posing any enduring threat to other satellites. The U.S. government asserted that this exercise was not truly a “test”; it was not an enterprise designed to develop a new ASAT capability. Instead, the avowed purpose was simply to negate the unique danger posed by the 5000 pound, school bus-sized USA-193, which had eluded U.S. efforts to re-assert control. The tumbling craft, it was feared, might soon re-enter the atmosphere intact, possibly surviving re-entry with its fuel tank full of corrosive chemicals posing a health hazard, should it land in a populated area. Skeptics, however, asserted that the true purpose was to flex U.S. ASAT muscle, in response to the February 2007 Chinese test, to demonstrate an agile space weapons capability, but to do so in a fashion that did not further pollute space with unwanted, long-lasting debris.<sup>73</sup>

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70. GREGO, *supra* note 64, at 4–5; Wilson, *supra* note 69, at 2542–43.

71. SPACE SECURITY 2008, *supra* note 2, at 163; Wilson, *supra* note 69, at 2542–43; *see also* GREGO, *supra* note 64, at 6–7; MOLTZ, *supra* note 20, at 239, 248–49, 274–75; Letter from Jack L. Brock, Jr., Managing Dir., U.S. Gen. Acct. Office, Acquisition and Sourcing Mgmt., to Bob Smith, U.S. Senator, Re: Defense Acquisitions: Status of KE-ASAT Program (Dec. 5, 2000), available at <http://www.globalsecurity.org/space/library/report/gao/d01228r.pdf> (last visited June 30, 2009).

72. Zhang Hui, *Space Weaponization and Space Security: A Chinese Perspective*, 2 CHINA SECURITY 24 (2006); David Wright & Laura Grego, *ASAT Capabilities of Planned US Missile Defense System*, DISARMAMENT DIPL., Dec. 2002–Jan. 2003, available at <http://www.acronym.org.uk/dd/dd68/68op02.htm> (last visited June 30, 2009).

73. Richard Weitz, *U.S. Satellite Shoot-Down Evokes International Concern and Criticism*, 24 WMD INSIGHTS 15 (2008); Kaufman & Pincus, *supra* note 35, at A3; *Situation Critical*, ECON. TIMES (Mumbai), Feb. 17, 2008, available at [http://economictimes.indiatimes.com/Features/The\\_Sunday\\_ET/Backpage/Situation\\_critical/article\\_show/2788710.cms](http://economictimes.indiatimes.com/Features/The_Sunday_ET/Backpage/Situation_critical/article_show/2788710.cms) (last visited June 30, 2009) (citing a U.S. diplomat as promising that the United States will assume liability for any damage inflicted by the interception of the USA-193 satellite); *see also* SPACE SECURITY 2009, *supra* note 4, ch. 1 (noting that the last trackable pieces of USA-193 fell back to earth on Oct. 9, 2008); Mineiro, *supra* note 21;

China had been known to be pursuing ASAT technology for some time,<sup>74</sup> with three space tests of its SC-19 interceptor either accidentally or deliberately just missing their targets in July 2005 and February 2006. On January 11, 2007, however, China suddenly became the third country to unveil an operational ASAT capability, destroying its aging Fengyun-1C weather satellite via high-speed head-on collision at 860 kilometers altitude. Launched from the Xichang Space Center aboard a mobile two-stage ballistic missile, the interceptor would be capable of holding at risk all satellites in low-earth orbit, including many of the world's most vital and sensitive spacecraft.<sup>75</sup>

Beyond those three acknowledged ASAT pioneers, any other country that pursues civilian space launch vehicles or military long-range ballistic missiles (or anti-missiles) simultaneously procures at least a latent ASAT capacity. The propulsion, guidance, and other interceptor technologies are certainly not child's play, but neither are they permanently beyond the capacities of the twenty or more States that have already

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Baker Spring, *Satellite Shootdown Was a Necessary Operation* (Heritage Found., Web Memo No. 1823, 2008), available at [http://www.heritage.org/Research/NationalSecurity/upload/wm\\_1823.pdf](http://www.heritage.org/Research/NationalSecurity/upload/wm_1823.pdf) (last visited June 30, 2009); News Release, Office of the Asst. Sec'y of Def., U.S. Dep't of Def. (Public Affairs), Satellite Debris Analysis Indicates Hydrazine Tank Hit, Feb. 25, 2008, available at <http://www.defenselink.mil/releases/release.aspx?releaseid=11709> (last visited June 30, 2009); News Briefing, U.S. Dep't of Def., Briefing with Gen. James Cartwright & NASA Admin. Michael Griffin, Feb. 14, 2008, available at <http://www.defenselink.mil/transcripts/transcript.aspx?transcriptid=41> (last visited June 30, 2009). See generally USA-193: SELECTED DOCUMENTS (P.J. Blount & Joanne Irene Gabrynowicz eds., 2009), available at <http://rescommunis.files.wordpress.com/2009/02/usa-193-selected-documents-2.pdf> (last visited June 30, 2009).

74. U.S. Dir. of Nat'l Intelligence, Open Source Ctr., *China: PLA Training Emphasizes Countermeasures Against Imagery Reconnaissance*, July 31, 2007, available at <http://www.fas.org/irp/dni/osc/china-imagery.pdf> (last visited June 30, 2009); U.S. Dep't of Def., Office of the Sec'y of Def., *Annual Report to Congress, Military Power of the People's Republic of China 2008*, at 3 ("China is developing a multi-dimensional program to limit or prevent the use of space-based assets by its potential adversaries during times of crisis or conflict."); Donald A. Mahley, Acting Dep. Asst. Sec'y for Threat Reduction, Export Controls, *The State of Space Security*, Remarks at the State Policy Institute, Elliot Sch. of Int'l Aff., George Washington Univ. (Jan. 24, 2008), available at [www.gwu.edu/~spi/Ambassador%20Donald%20Mahley.pdf](http://www.gwu.edu/~spi/Ambassador%20Donald%20Mahley.pdf) (last visited June 30, 2009); see also KAN, *supra* note 43; Frank M. Walsh, *Forging a Diplomatic Shield for American Satellites: The Case for Reevaluating the 2006 National Space Policy in Light of a Chinese Anti-Satellite System*, 72 J. AIR L. & COM. 759, 766 (2007); Larry M. Wortzel, *The Chinese People's Liberation Army and Space Warfare: Emerging United States-China Military Competition*, AM. ENTER. INST., Oct. 17, 2007, at 7.

75. KAN, *supra* note 43; SPACE SECURITY 2008, *supra* note 2, at 165; Craig Covault, *Space Control*, 166 AVIATION WK. & SPACE TECH. 59 (2007); Geoffrey Forden, *After China's Test: Time for a Limited Ban on Anti-Satellite Weapons*, 37 ARMS CONTROL TODAY 19 (Apr. 2007); Theresa Hitchens, *U.S.-Sino Relations in Space: From "War of Words" to Cold War in Space?* 5 CHINA SECURITY 12 (Winter 2007); Gregory Kulacki & Jeffrey G. Lewis, *Understanding China's Antisatellite Test*, 15 NONPROLIFERATION REV. 335 (2008); Miniero, *supra* note 21; Walsh, *supra* note 74; Ball, *supra* note 64; Kelso, *supra* note 43.

mastered the art of basic space flight, missilery, and satellite operations.<sup>76</sup> In particular, the United Kingdom, Israel, and India are said to be exploring techniques for exoatmospheric interception.<sup>77</sup>

Turning to directed energy ASAT systems, the story is more concise. The only publically acknowledged test of this concept came with the U.S. MIRACL (Mid-InfraRed Advanced Chemical Laser) experiment in October 1997. MIRACL was constructed in 1980, but it remains the United States' most prodigious laser, capable of two megawatts of power. In the experiment, the Air Force pinpointed it at a defunct MSTI-3 satellite 420 kilometers overhead, to assess its effectiveness at not only locating, identifying, and tracking, a typical satellite, but also damaging, disrupting, or destroying it.<sup>78</sup>

Remarkably, while the MIRACL itself basically failed to validate the mission, officials were surprised to discover that a companion lower-powered laser, intended merely to align the system and track the experiment, proved sufficiently energetic to blind the target satellite temporarily. Authorities had not anticipated that a piece of essentially commercially available laser equipment could possess such impressive military power.<sup>79</sup>

The U.S.S.R., too, had experimented with high-powered lasers, including exploring possible ASAT missions, but few data are available to describe the program. U.S. authorities during the 1970s and 1980s had

76. NANCY GALLAGHER & JOHN D. STEINBRUNER, RECONSIDERING THE RULES FOR SPACE SECURITY 60 (2008); SPACE SECURITY 2008, *supra* note 2, at 69, 168 (noting that nine States already have the ability to launch objects into orbit, several more are working in that direction, eighteen other States have the capacity to launch objects into space without achieving orbit, and eleven States currently deploy medium- or long-range ballistic missiles); Rumsfeld Comm'n, *Report of the Commission to Assess United States National Security Space Management and Organization* 18–22 (2001); Jeffrey Lewis, "Hit-to-Kill" and the Threat to Space Assets, in CELEBRATING THE SPACE AGE, *supra* note 16, at 147, 149 (discussing kinetic interceptor technology research in India, Israel, Japan, and Europe); Thomas Graham, Jr., *Space Weapons and the Risk of Accidental Nuclear War*, 35 ARMS CONTROL TODAY 12, 14 (Dec. 2005) (estimating that twenty-eight countries currently have missiles capable of launching ASAT weapons into near-earth orbit); Steven Lee Myers, *Look Out Below: The Arms Race in Space May Be On*, N.Y. TIMES, Mar. 9, 2008, at 3.

77. SPACE SECURITY 2008, *supra* note 2, at 163; Guiney, *supra* note 12.

78. SPACE SECURITY 2008, *supra* note 2, at 164; *Pentagon Beams over Military Laser Test*, CNN, Oct. 20, 1997, <http://web.archive.org/web/20071230052044/http://www.cnn.com/US/9710/20/pentagon.laser/> (last visited July 17, 2009); News Briefing, U.S. Dep't of Def., Briefing with Kenneth H. Bacon, Dec. 11, 1997, available at [http://www.fas.org/spp/military/program/asat/t12111997\\_t1211asd.html](http://www.fas.org/spp/military/program/asat/t12111997_t1211asd.html) (last visited June 30, 2009); *U.S. Laser Weapon Test*, FOREIGN MEDIA REACTION DAILY DIG., Oct. 22, 1997, <http://www.fas.org/spp/military/program/asat/971022-miracle-mr.htm> (last visited June 30, 2009).

79. GREGO, *supra* note 64, at 6; SPACE SECURITY 2008, *supra* note 2, at 164; John Donnelly, *Laser of 30 Watts Blinded Satellite 300 Miles High*, DEF. WK., Dec. 8, 1997, at 1; see also STARES, *supra* note 7, at 214–15 (describing U.S. research on particle beam and laser ASAT systems during the late 1970s and early 1980s); Ramey, *supra* note 7, at 23–27.

identified a site at Sary Shagan in Kazakhstan as a possible focal point for this effort, but an invited inspection at the facility in 1989 largely dispelled concerns about its true capacities.<sup>80</sup>

More recently, China has also demonstrated its keen interest in directed energy ASATs, and has constructed several energetic lasers that could be suitable for that mission. Fragmentary reports, difficult to evaluate or corroborate, suggest that in September 2006, China may have illuminated overflying U.S. satellites with a high-powered laser, possibly as a test of a blinding system, perhaps on multiple occasions. To date, the public record is ambiguous about the true nature of this “laser-painting” activity and its effects on the supposedly targeted U.S. spacecraft.<sup>81</sup>

Ominously, the relevant technology (employing lasers or other directed energy systems) may be well within reach of even modest military powers. One leading group of space security experts reported in 2006 that “[a]s many as 30 states may already have the capability to use low-power lasers to degrade unhardened satellite sensors.”<sup>82</sup> The governments of Libya, Cuba, and Iran as well as non-state actors such as the Falun Gong spiritual group in China have exercised the ability to jam, disrupt, or co-opt the satellite operations of others.<sup>83</sup> The leading

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80. Frank von Hippel & Thomas B. Cochran, *The Myth of the Soviet “Killer” Laser*, N.Y. TIMES, Aug. 19, 1989, at 23; Christopher Joyce & Jeff Hecht, *Threat Dims from Soviet Laser Weapon*, NEW SCIENTIST, July 22, 1989, at 23; Bill Keller, *American Team Gets Close Look at Soviet Laser*, N.Y. TIMES, July 9, 1989, at 1; see also GREGO, *supra* note 64, at 5; STARES, *supra* note 7, at 145–46.

81. Warren Ferster & Colin Clark, *NRO Confirms Chinese Laser Test Illuminated U.S. Spacecraft*, SPACE NEWS, Oct. 2, 2006, at 10, available at [http://www.space.com/spaceneews/archive06/chinalaser\\_1002.html](http://www.space.com/spaceneews/archive06/chinalaser_1002.html) (last visited June 30, 2009); Vago Muradian, *China Attempted to Blind U.S. Satellites with Laser*, DEF. NEWS, Sept. 28, 2006, at 1. See generally MOLTZ, *supra* note 20, at 288; GALLAGHER & STEINBRUNER, *supra* note 76, at 31 n.87; SPACE SECURITY 2008, *supra* note 2, at 164; Elaine M. Grossman, *Is China Disrupting U.S. Satellites?* INSIDEDEFENSE.COM, Oct. 13, 2006, <http://www.military.com/features/0,15240,116694,00.html>; Yousaf M. Butt, Harv.-Smithsonian Ctr. for Astrophysics, Ground-Space Laser Rules of the Road: Lessons from 2006 Lasing of U.S. SpySat, Presentation at the Stimson Center (Feb. 12, 2009), (unpublished presentation), available at [http://www.stimson.org/space/pdf/YB\\_Laser\\_Ranging\\_2\\_2009.pdf](http://www.stimson.org/space/pdf/YB_Laser_Ranging_2_2009.pdf) (last visited July 29, 2009) (suggesting that the 2006 blinding incident may have been an accidental effect of Chinese laser ranging, intended merely to acquire data about U.S. satellite orbits, rather than to dazzle or damage the satellites); Yousaf Butt, *Satellite Laser Ranging in China* (Union of Concerned Scientists, Technical Working Paper, Jan. 8, 2007), available at [http://www.ucsusa.org/nuclear\\_weapons\\_and\\_global\\_security/space\\_weapons/technical\\_issues/chinese-lasers-and-us.html](http://www.ucsusa.org/nuclear_weapons_and_global_security/space_weapons/technical_issues/chinese-lasers-and-us.html) (last visited June 30, 2009).

82. SPACESECURITY.ORG, SPACE SECURITY 2006, at 134 (2006), available at [www.spacesecurity.org/SSI2006.pdf](http://www.spacesecurity.org/SSI2006.pdf) (last visited June 30, 2009), summarized in Estabrooks, *supra* note 15, at 103; Donnelly, *supra* note 79.

83. David Shiga & AFP, *Mysterious Source Jams Satellite Communications*, NEW SCIENTIST, Jan. 26, 2007, available at <http://www.newscientist.com/article/dn11033-mysterious-source-jams-satellite-communications.html> (last visited June 30, 2009) (noting incidents of

group of satellite users has identified fifteen incidents of deliberate interference with satellite communications since January 2005.<sup>84</sup>

Future directions for ASAT activities in the three predominant States or elsewhere remain impossible to predict. Even for the United States, the Department of Defense's future budget proposals fail to disclose with clarity exactly what types of ASAT weapons activities may be undertaken, or on what timetable; it is clear, however, that the Pentagon has retained a significant interest in multiple aspects of the field.<sup>85</sup> The Obama administration's policies regarding ASAT development remain, at this writing, undefined.<sup>86</sup>

Similarly for China, speculation is rampant about whether the most recent orbital systems, such as the Shenzhou-7 satellite and its BX-1 companion satellite, launched in September 2008, are intended to expand Beijing's ASAT capabilities, or whether they will play a more benign role.<sup>87</sup>

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Indonesia jamming a satellite leased by Tonga to a Hong Kong company and claims by the United States that Cuba was jamming satellite broadcasts into Iran); *see also* SPACE SECURITY 2008, *supra* note 2, at 157–58; Jeffrey Lewis, *The Role of Non-State Actors in Outer Space Security*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY, *supra* note 15, at 31.

84. GALLAGHER & STEINBRUNER, *supra* note 76, at 20, 27.

85. SPACE SECURITY 2008, *supra* note 2, at 169–72 (discussing programs, often classified or otherwise hidden from public view, in the United States and elsewhere aimed at developing technological capacities that would enable ASAT functions); Theresa Hitchens et al., *U.S. Space Weapons: Big Intentions, Little Focus*, 13 NONPROLIFERATION REV. 35 (2006); William J. Broad, *Administration Conducting Research into Laser Weapon*, N.Y. TIMES, May 3, 2006, at A22; Guy Gugliotta, *Space Invaders*, ATLANTIC, Sept. 2008, at 30, available at <http://www.theatlantic.com/doc/200809/space-war>; Victoria Samson, *DARPA's Potential Space Weapons Programs*, CTR. FOR DEF. INFO, Aug. 4, 2008, [http://www.secureworldfoundation.org/siteadmin/images/files/file\\_203.pdf](http://www.secureworldfoundation.org/siteadmin/images/files/file_203.pdf) (last visited June 30, 2009); *Spy Satellites Turn Their Gaze onto each Other*, NEW SCIENTIST, Jan. 24, 2009, available at <http://www.newscientist.com/article/mg20126925.800-spy-satellites-turn-their-gaze-onto-each-other.html> (last visited June 30, 2009) (noting that the Pentagon acknowledges using two miniature covert satellites to inspect closely another satellite—a maneuver that helps develop both peaceful and ASAT capabilities); FED'N OF AM. SCIENTISTS, ANTI-SATELLITE WEAPONS, <http://www.fas.org/spp/military/program/asat/index.html> (last visited June 30, 2009).

86. President Obama's Defense Agenda, The White House, <http://www.whitehouse.gov/agenda/defense/> (last visited June 30, 2009).

87. Peter J. Brown, *China Gets a Jump on US in Space*, ASIA TIMES (Hong Kong), Oct. 25, 2008, available at <http://www.atimes.com/atimes/China/JJ25Ad02.html> (last visited June 30, 2009) (noting that the two new satellites closely approached the International Space Station; observers disagree whether their maneuvers should be considered potentially hostile); Brian Weeden, *China's BX-1 Microsatellite: A Litmus Test for Space Weaponization*, SPACE REV., Oct. 20, 2008, available at <http://www.thespacereview.com/article/1235/1> (last visited June 30, 2009).

### C. Which Verbs to Study

In assessing the future evolution of ASAT activities, observers must be cognizant of the multiple steps in the weapons development cycle. Typically, a new weapon (for space applications or any other) must survive a series of crucibles, variously denominated as: research, development, testing, manufacturing, deployment, use, and retirement.<sup>88</sup> Each stage poses its own challenges, but for present purposes, this Article focuses on two critical components: testing (especially flight testing or evaluation in outer space) and use in combat.

The current "box score" of these two types of ASAT activities reveals (with some uncertainty, due to incomplete declassification of this sensitive history, and doubt about how to categorize particular actions) approximately sixty genuine ASAT *tests* in space, conducted by three countries; barely half a dozen of those events occurred within the past two decades. Regarding *use* in combat or crisis, the score is zero—despite numerous profound provocations during the half century since the Space Age began, no country has ever employed (or, so far as the public record indicates, even threatened to employ) any type of ASAT weaponry in hostilities against an enemy.<sup>89</sup>

### D. ASAT Treaty Negotiation Efforts

Arms controllers have hardly been ignorant or indifferent about the danger of ASAT weapons, but so far, they have been largely impotent to do anything effective about it.<sup>90</sup> The failure may be attributed to the sheer complexity of the issues, the multiplicity of national and commercial interests at play, and the range of competing priorities occupying negotiators' attentions. But surely one leading impediment has been the

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88. See Zhai Yucheng, *Legal Approach to Common Security in Outer Space: An Examination of Solutions to Outer Space Weaponization Issues*, in SAFEGUARDING SPACE SECURITY, *supra* note 21, at 47 (elaborating on various arms control initiatives that could be applied at different stages of the weapons development cycle).

89. SPACE SECURITY 2008, *supra* note 2, at 162 (listing ASAT testing programs in United States, Soviet Union, and China).

90. See GALLAGHER & STEINBRUNNER, *supra* note 76, 7–12 (describing early efforts to establish a regime of restraint regarding military use of space). For comparison, a familiar tactic of arms control has been to negotiate legally binding instruments that declare certain geographic regions to be "off limits" for weapons, or for certain kinds of weapons. The 1959 Antarctic Treaty, Dec. 1, 1959, 12 U.S.T. 794, 402 U.N.T.S. 71, for example, provided something of a template for the 1967 Outer Space Treaty. Likewise, the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof (informally known as the 1971 Seabed Arms Control Treaty), Feb. 11, 1971, 23 U.S.T. 701, 955 U.N.T.S. 115, demilitarizes that region. The 1967 Treaty for the Prohibition of Nuclear Weapons in Latin America, Feb. 14, 1967, 22 U.S.T. 762, 634 U.N.T.S. 281, was the first of several regional accords that prohibit nuclear weapons and associated activities in specified geographic areas.

persistent inability of leading authorities in Washington, D.C. and Moscow to decide whether a system of mutual restraint, or a strategy of unilateral advantage-seeking, offers a better approach to security in space.

The first and only concerted effort to address the issue internationally came in a 1978–1979 three-round series of bilateral U.S.-Soviet treaty negotiations. The participants raised (but were largely unable to reconcile competing viewpoints about) a series of tricky issues such as how to define appropriately an ASAT (including whether the U.S. space shuttle program should be included, because despite its manifestly peaceful purpose, it could nonetheless be used to maneuver toward and “capture” an enemy space vehicle); how to verify compliance with any treaty restrictions (because furtive testing and deployment of a covert ASAT might be difficult for the other side to monitor with the requisite confidence); and who should be invited to join the treaty regime (that is, should the agreement be concluded solely between the two superpowers, or should other spacefaring States also be invited to sign?)<sup>91</sup>

Those negotiations soon dissolved under the pressure of the deteriorating U.S.-Soviet relationship after Moscow’s invasion of Afghanistan in December 1979. A subsequent effort during the Reagan administration, to address some of the same issues in the Defense and Space Talks met similar frustration, as there seemed to be precious little consensus between the two space leviathans about what to ban, what to permit, and how to reliably ascertain the difference.<sup>92</sup>

For the past decade or more, international dialog on space weaponization has shifted into multilateral fora, especially the United Nations General Assembly (UNGA) (operating principally through its Committee on the Peaceful Uses of Outer Space (COPUOUS) and its Legal Subcommittee)<sup>93</sup> and the U.N.-affiliated Conference on Disarmament (CD).<sup>94</sup> The discussion has now been sufficiently prolonged, and suffi-

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91. MOLTZ, *supra* note 20, at 186–87; STARES, *supra* note 7, at 193–200; Joseph, *supra* note 2; Pike & Stambler, *supra* note 64, at 995; St. James, *supra* note 20; Report to the Congress on U.S. Policy on ASAT Arms Control, The White House, Mar. 31, 1984.

92. See Pike & Stambler, *supra* note 64, at 995; see also CTR. FOR SECURITY POL’Y, TEST THE MIRACL LASER AGAINST A SATELLITE: THE OUTCOME OF THE NEXT WAR MAY TURN ON A PROVEN AMERICAN A.S.A.T. CAPABILITY (1997), available at <http://204.96.138.161/p1882.xml> (last visited June 30, 2009); Mahley, *supra* note 74, at 4.

93. Regarding COPUOS and the Legal Subcommittee, see <http://www.unoosa.org/oosa/COPUOS/copuos.html> (last visited July 17, 2009). See also Eilene Galloway, *Consensus Decisionmaking by the United Nations Committee on the Peaceful Uses of Outer Space*, in *SPACE LAW*, *supra* note 20, at 73.

94. The CD is the leading arms control negotiating venue and has successfully midwifed numerous indispensable international agreements. See generally Manasi Kakatkar, *Conference on Disarmament Comes Up Empty Again*, ARMS CONTROL TODAY, Oct. 2008, at 47; Michael Krepon, *The Conference on Disarmament: Means of Rejuvenation*, ARMS CON-

ciently ritualized, to have earned its own distinctive acronym—insider participants refer knowingly to “PAROS” (or Prevention of an Arms Race in Outer Space) efforts. The UNGA annually adopts a PAROS resolution, asserting, in varying formulations, the global interest in peacefully reconciling the competing uses of outer space and in avoiding any further compromise of the generally benign security environment.<sup>95</sup> The CD also maintains PAROS as a key item on its roster of topics, and has been the focal point for space-related discussions. Russia and China, in particular, have repeatedly tabled draft PAROS treaties for consideration by delegates there.<sup>96</sup>

The United States, however, has been the PAROS naysayer. For several years, the U.S. delegate in the UNGA conspicuously abstained from the annual resolution; in 2005, the United States became the first country to cast a negative vote in the UNGA on this topic.<sup>97</sup> Likewise, Washington, D.C. authorities have resisted all proposals to give the CD a

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TROL TODAY, Dec. 2006, at 18; Paul Meyer, *The Conference on Disarmament: Getting Back to Business*, ARMS CONTROL TODAY, Dec. 2006, at 16; Conference on Disarmament website, [http://www.unog.ch/80256EE600585943/\(httpPages\)/2D415EE45C5FAE07C12571800055232B?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/2D415EE45C5FAE07C12571800055232B?OpenDocument) (last visited July 29, 2009).

95. Prevention of an Arms Race in Outer Space, G.A. Res. 63/40, U.N. Doc. A/RES/63/40 (Jan. 12, 2009). The UNGA has adopted near-identical resolutions in previous years. *See, e.g.*, G.A. Res. 62/20, U.N. Doc. A/RES/62/20 (Jan. 10, 2008); G.A. Res. 61/58, U.N. Doc. A/RES/61/58 (Jan. 3, 2007); G.A. Res. 60/54, U.N. Doc. A/RES/60/54 (Jan. 6, 2006); *see also* International Cooperation in the Peaceful Uses of Outer Space, G.A. Res. 61/111, U.N. Doc. A/RES/61/111 (Jan. 15, 2007); International Cooperation in the Peaceful Uses of Outer Space, G.A. Res. 60/99, U.N. Doc. A/RES/60/99 (Jan. 6, 2006); Review of the Implementation of the Recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, G.A. Res. 59/2, U.N. Doc. A/RES/59/2 (Dec. 3, 2004); Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, G.A. Res. 54/68, U.N. Doc. A/RES/54/68 (Feb. 11, 2000).

96. *See* Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects, P.R.C.-Russ., Feb. 12, 2008, *available at* <http://www.reachingcriticalwill.org/political/cd/papers08/1session/Feb12%20Draft%20PPWT.pdf> (last visited June 30, 2009); Letter from Representatives of China and Russia to Secretary-General of the Conference on Disarmament (June 28, 2002), *available at* <http://cns.miis.edu/research/space/pdf/cd1679.pdf> (last visited June 30, 2009) (transmitting working paper entitled “Possible Elements for a Future International Legal Agreement on the Prevention of the Deployment of Weapons in Outer Space, The Threat or Use of Force Against Outer Space Objects”); *see also* SPACE SECURITY 2008, *supra* note 2, at 54–55; Wang Daxue, *Security in Outer Space: Do Not Duplicate Historical Mistakes*, in NEXT GENERATION, *supra* note \*, at 13; Zhang Hui, *Space Weaponization and Space Security: A Chinese Perspective*, 2 CHINA SECURITY 24 (2006); Victor Vasiliev, *The Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects*, in NEXT GENERATION, *supra* note \*, at 145.

97. MOLTZ, *supra* note 20, at 246–47, 282; SPACE SECURITY 2008, *supra* note 2, at 52, 56; John R. Crook, *Contemporary Practice of the United States Relating to International Law*, *New Statement of U.S. Space Policy*, 101 AM. J. INT’L L. 204, 207 (2007) (noting that the vote in the UNGA in 2006 on the now-traditional PAROS resolution was 178 for, one against (United States), and one abstention (Israel)).



mandate to open formal negotiations on space weapons, or even to begin serious preliminary treaty discussions.<sup>98</sup> Since the CD operates by a strict “consensus” rule, even as to agenda-setting decisions, U.S. opposition has effectively spiked all meaningful consideration of the subject.<sup>99</sup>

The now-familiar U.S. refrain has been to assert that there is no need for international discussion on “preventing” an arms race in space, because there is currently no ongoing or imminent arms race there, and any effort to elaborate additional legal constraints would therefore be premature and unwise.<sup>100</sup> Astonishingly, for almost ten years, the CD has been moribund, unable to circumvent the U.S. veto on PAROS or to find any compromise enabling it to open negotiations on any other arms control issue, either.<sup>101</sup>

The most emphatic expression of the U.S. anti-PAROS stance is contained in the Bush administration’s U.S. National Space Policy document, articulated on August 31, 2006. This rather forward-leaning pronouncement speaks ambitiously about the principle of U.S. “space control,” directly asserting the intention to deny potential enemies the ability to exploit their space assets in a time of conflict. The text does not

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98. MOLTZ, *supra* note 20, at 246–47, 282.

99. *Id.* at 246; SPACE SECURITY 2008, *supra* note 2, at 52, 56; Statements Made at the 2007 Session of the Conference on Disarmament, <http://www.reachingcriticalwill.org/political/cd/speeches07/topics.html> (last visited June 30, 2009) (indicating that many States wanted to address the issue of prevention of an arms race in outer space, and regretted that political conditions did not enable the CD to take up the topic).

100. Paula A. DeSutter, U.S. Asst. Sec’y of State for Verification, Compliance, & Implementation, *Is An Outer Space Arms Control Treaty Verifiable?*, Remarks at the National Space Club (Mar. 4, 2008), available at [http://www.nti.org/e\\_research/official\\_docs/dos/dos030408.pdf](http://www.nti.org/e_research/official_docs/dos/dos030408.pdf) (last visited June 30, 2009) (arguing that a treaty limiting ASAT weapons could not be adequately monitored); Eric M. Javits, U.S. Rep. to the Conference on Disarmament, Remarks to the Conference on Future Security in Space (May 29, 2002), available at <http://www.globalsecurity.org/space/library/news/2002/space-020530-usia01.htm> (last visited June 30, 2009) (“There is simply no problem in outer space for arms control to solve.”); Joseph, *supra* note 2 (arguing that “the existing treaty regime is sufficient”); Christina Rocca, Ambassador, U.S. Permanent Rep. to the U.N., Prevention of an Arms Race in Outer Space, Statement to the Conference on Disarmament (Feb. 13, 2007), available at <http://www.usmission.ch/Press2007/0213PAROS.html> (last visited June 30, 2009); see also Crook, *supra* note 97, at 206 (quoting the U.S. delegation’s 2006 statement to the United Nations, which asserted that “there is no prospect of an arms race in space” and “space does not lend itself to an old-style ‘arms control’ approach”); Zhang Hui, *Space Weaponization and Space Security: A Chinese Perspective*, 2 CHINA SECURITY, 24, 29 (2006) (quoting John Bolton, then Undersecretary of State for Arms Control and Non-Proliferation, as stating, “the current international regime regulating the use of space meets all our purposes. We see no need for new agreements”).

101. SPACE SECURITY 2008, *supra* note 2, at 58; WOLTER, *supra* note 21, at 67–75; Stephen G. Rademaker, *The Conference on Disarmament: Time Is Running Out*, ARMS CONTROL TODAY, Dec. 2006, at 13; Henrietta Wilson, *The Conference on Disarmament in 2008: Still in Denial*, DISARMAMENT DIPL., Summer 2008, available at <http://www.acronym.org.uk/dd/dd88/88news02.htm> (last visited July 19, 2009); Kakatkar, *supra* note 94.

explicitly adopt the goal of developing a new operational U.S. ASAT capability, but that is clearly where it is aimed. The policy document further implicates the objective of so dominating the possibilities for space weaponization that other States would be dissuaded or deterred even from entering any such competition.<sup>102</sup>

In rejecting calls for any new PAROS treaty that might inhibit pursuit of the desired new ASAT muscle, the policy asserts,

[t]he United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests.<sup>103</sup>

From this perspective, outer space is simply a geographic location, a potential theater of conflict like any other, and a possible battlefield in which the United States must be prepared to assert its national security interests, prevailing via force if need be. In fact, since space is appreciated as “the new high ground,” potentially decisive in future high-technology combat, the United States should be especially wary about agreeing to any restraints that might inhibit the development of ASAT prowess or the exercise of future space weapons capabilities.<sup>104</sup>

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102. MOLTZ, *supra* note 20, at 296; SPACE SECURITY 2008, *supra* note 2, at 63 (discussing other related U.S. space policy pronouncements which make similar assertions about controlling outer space); U.S. National Space Policy, *supra* note 7, at 2; *see also* JCS SPACE OPERATIONS, *supra* note 2, at II-1; Marc Kaufman, *Talk of Satellite Defense Raises Fears of Space War*, WASH. POST, Dec. 17, 2006, at A12; Joseph, *supra* note 2.

In the precursor to the 2006 National Space Policy Document, the Commission to Assess United States National Security Space Management and Organization, chaired by Donald Rumsfeld (who shortly thereafter became Secretary of Defense) judged that U.S. dependence on satellite systems created a serious vulnerability to attack, saying that “the U.S. is an attractive candidate for a Space Pearl Harbor,” and pointing to China as a primary threat, noting that “China’s military is developing methods and strategies for defeating the U.S. military in a high-tech and space-based future war.” Rumsfeld Comm’n, *supra* note 76, at xiv, 22–23.

103. U.S. National Space Policy, *supra* note 7, at 2; *see also* Mahley, *supra* note 74, at 4 (“[The Bush administration policy] acknowledges that additional binding arms control agreements are simply not a viable tool for enhancing the long-term space security interests of the United States or its allies. As we learned from considerable experience, any treaty that seeks permanent prohibitions, especially on inherently defensive capabilities, in one era can rapidly become obsolete—and sometimes dangerously obsolete.”).

104. HYTEN, *supra* note 3, at 7–11; MOLTZ, *supra* note 20, at 262–64 (summarizing the views of those inside and outside the Bush administration who view outer space as an inevitable, and potentially decisive, theater of combat, in which the United States should be prepared to fight and prevail); Rumsfeld Comm’n, *supra* note 76, at 100 (concluding that space warfare is “a virtual certainty,” for “every medium—air, land, and sea—has seen conflict” and “[r]eality indicates that space will be no different”); *see also* Karl P. Mueller, *Totem and Taboo: Depolarizing the Space Weaponization Debate*, in SPACE WEAPONS: ARE THEY NEEDED?, *supra* note 7, at 1; Columba Peoples, *Assuming the Inevitable? Overcoming the*

The Obama administration has signaled a stark change in course on these matters, posting onto the White House website, only moments after the January 20, 2009 inauguration, a new national defense policy, declaring:

The Obama-Biden Administration will restore American leadership on space issues, seeking a worldwide ban on weapons that interfere with military and commercial satellites. They will thoroughly assess possible threats to U.S. space assets and the best options, military and diplomatic, for countering them, establishing contingency plans to ensure that U.S. forces can maintain or duplicate access to information from space assets and accelerating programs to harden U.S. satellites against attack.<sup>105</sup>

Exactly how this new agenda will be implemented in the Conference on Disarmament, and regarding PAROS efforts more generally, remains to be seen.

Finally, before leaving this discussion of the international treaty law of outer space, and the incomplete and largely frustrated efforts to emplace more robust legal bulwarks to retard the weaponization of the exoatmospheric realm, it is important to note also a relatively recent renewal of the concept of “non-legally-binding” PAROS proposals.

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*Inevitability of Outer Space Weaponization and Conflict*, 29 CONTEMP. SECURITY POL’Y 502 (2008) (critiquing the “inevitability thesis,” which argues that weaponization of outer space is unavoidable); Jon Kyl, *China’s Anti-Satellite Weapons and American National Security*, HERITAGE FOUND., Feb. 1, 2007, available at <http://www.heritage.org/research/nationalsecurity/h1990.cfm> (last visited June 30, 2009).

For critiques and defenses of the 2006 space policy, and contrasts with the predecessor instrument, see Theresa Hitchens, *The Bush National Space Policy: Contrasts and Contradictions*, CTR. DEF. INFO., Oct. 13, 2006, available at [http://www.cdi.org/program/document.cfm?DocumentID=3692&from\\_page=../index.cfm](http://www.cdi.org/program/document.cfm?DocumentID=3692&from_page=../index.cfm) (last visited June 30, 2009) (stating that the new policy “undercuts 40 years of tradition that has kept competition in space to a dull roar and dampened drivers to conflict.”); see also Steven Lambakis, *Space Weapons: Refuting the Critics*, 105 HOOVER INST. POL’Y REV. 41 (2001); Jeff Kueter, *The War in Space Has Already Begun*, MARSHALL INST. POL’Y OUTLOOK, Oct. 2006, available at <http://www.marshall.org/pdf/materials/459.pdf> (last visited June 30, 2009); *The Bush National Space Policy: Freedom of Action, Not Diplomacy*, HENRY L. STIMSON CTR., Oct. 10, 2006, <http://www.stimson.org/?SN=WS200610101122> (last visited June 30, 2009).

105. President Obama’s Defense Agenda, *supra* note 86. See generally Andrea Shalal-Esa, *Challenges Loom as Obama Seeks Space Weapons Ban*, REUTERS, Jan. 25, 2009, <http://www.reuters.com/article/newsOne/idUSTRE50015X20090125> (last visited June 30, 2009); Advancing the Frontiers of Space Exploration, BarackObama.com, [http://www.barackobama.com/pdf/policy/Space\\_Fact\\_Sheet\\_FINAL.pdf](http://www.barackobama.com/pdf/policy/Space_Fact_Sheet_FINAL.pdf) (last visited June 30, 2009) (presidential campaign platform regarding “international, cooperative approach to space security”); Council for a Livable World, 2008 Presidential Candidates’ Full Responses, Question No. 5, available at [http://www.livableworld.org/assets/pdfs/2008\\_presidential\\_candidates\\_questionnaire\\_responses.pdf](http://www.livableworld.org/assets/pdfs/2008_presidential_candidates_questionnaire_responses.pdf) (last visited July 20, 2009) (quoting then-presidential candidate Barack Obama as stating that “weapons in space are a bad idea” and that space-faring nations should pursue either a treaty or “Code of Conduct”).

Several authors and non-governmental organizations—and now, some governments—have suggested that if U.S. resistance blocks the articulation of a formal arms control treaty for outer space, perhaps some traction on the problem can be gained via more modest undertakings: informal agreements on “rules of the road” for outer space; tacit understandings that the space powers will mutually avoid especially provocative actions; or “politically binding” instruments through which countries express their shared intentions to eschew conduct that could be misinterpreted as threatening or could lead to accidents or unwanted crises.<sup>106</sup>

The Henry L. Stimson Center in Washington, D.C. has sponsored the most ambitious and successful such “soft law” enterprise, drafting a proposed “Code of Conduct” for outer space, under which countries would refrain from specified hazardous or irresponsible space activities. Proponents have vetted the concept with experts in and out of government in several countries, and it has attracted considerable interest.<sup>107</sup> The European Union has explicitly endorsed this approach,<sup>108</sup> and the British government has issued a White Paper supporting the suggestion.<sup>109</sup>

Until recently, the U.S. government has seemed no more amenable to these softer constraints on ASAT activities than it has been to commencement of formal PAROS treaty negotiations, and no changes in law, policy, or practice have yet occurred. But there have been indications

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106. SPACE SECURITY 2008, *supra* note 2, at 56–57 (discussing proposals from governments and non-governmental organizations in 2007 suggesting that the time might be ripe to turn to non-legally-binding “rules of the road” for outer space); *see also* Transparency and Confidence-Building Measures in Outer Space Activities, G.A. Res. 62/43, U.N. Doc. A/RES/62/43 (Jan. 8, 2008); Douglas G. Aldworth, *Creating Rules-Based Behaviour to Help Space-Faring Nations Avoid Conflict in Space*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY, *supra* note 15, at 55; Phillip J. Baines, *The Potential for Outer Space Confidence-Building Measures*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY, *supra* note 15, at 125; Samuel Black, *No Harmful Interference with Space Objects: The Key to Confidence-Building* (Stimson Ctr., Report No. 69, 2008); Andrey Makarov, *Transparency and Confidence-Building Measures: Their Place and Role in Space Security*, in NEXT GENERATION, *supra* note \*, at 69; Anton V. Vasiliev & Alexander A. Klavovsky, *Transparency and Confidence-Building Measures in Outer Space*, in BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY, *supra* note 15, at 139; Jeff Abramson, *EU Issues Space Code of Conduct*, ARMS CONTROL TODAY, Jan.–Feb. 2009, at 30, 30–31.

107. *See generally* Henry L. Stimson Ctr., Space Security Program, <http://www.stimson.org/space/?SN=WS200702131213> (last visited July 19, 2009); European Union, Draft Code of Conduct for Outer Space Activities, Dec. 8–9, 2008, [http://www.stimson.org/space/pdf/EU\\_Code\\_of\\_Conduct.pdf](http://www.stimson.org/space/pdf/EU_Code_of_Conduct.pdf) (last visited June 30, 2009).

108. Bernhard Brasack, Perm. Rep. of Germany to the Conf. on Disarmament on Behalf of the E.U., Statement to the Conference on Disarmament on the Prevention of an Arms Race in Outer Space (Feb. 13, 2007), *available at* <http://www.reachingcriticalwill.org/political/cd/speeches07/1session/Feb13EU1.pdf> (last visited June 30, 2009).

109. U.K. FOREIGN & COMMONWEALTH OFFICE, LIFTING THE NUCLEAR SHADOW: CREATING THE CONDITIONS FOR ABOLISHING NUCLEAR WEAPONS 38 (2009), *available at* <http://www.fco.gov.uk/resources/en/pdf/pdf1/nuclear-paper> (last visited June 30, 2009).

that—in the aftermath of the Chinese ASAT enterprise—the official U.S. posture may yet incline toward somewhat greater receptivity to a space code of conduct.<sup>110</sup>

#### IV. GENERAL CUSTOMARY INTERNATIONAL LAW AND ASATs

In light of the failure, for some decades now, to address ASAT issues effectively via treaty law, the various stakeholders should now begin to consider alternative vehicles. This Article presents one such possibility: enhancement of customary international law. Non-lawyers, and even lawyers who are not schooled in public international law specifically, may not fully appreciate the power and stature of CIL. This Part therefore defines this jurisprudence, explains how it is created and how it operates, and examines the extent to which it might substitute for or complement formal treaty negotiations in pursuit of PAROS objectives.

CIL is an ancient, albeit somewhat murky, form of obligation, arising from the unwritten practice of States; it is nonetheless a leading, well-respected source of international law, fully on par with treaties.<sup>111</sup> CIL is specified in the Statute of the International Court of Justice (ICJ) as an appropriate set of obligations for the court to apply,<sup>112</sup> and the ICJ regularly does so,<sup>113</sup> as do the federal courts in the United

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110. See MOLTZ, *supra* note 20, at 299–300 (quoting Air Force General Kevin P. Chilton as calling for the United States to examine anew the potential utility of a space code of conduct); Mahley, *supra* note 74, at 3 (“China’s counter-space activities have prompted the U.S. to consider initiatives based on our long-standing support for voluntary transparency and confidence-building measures.”).

111. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES, pt. I, intro. note (1987). See generally IAN BROWNLIE, *PRINCIPLES OF PUBLIC INTERNATIONAL LAW* 4 (4th ed. 1990); ANTHONY D’AMATO, *THE CONCEPT OF CUSTOM IN INTERNATIONAL LAW* 74–97 (1971); JEAN-MARIE HENCKAERTS & LOUISE DOSWALD-BECK, *CUSTOMARY INTERNATIONAL HUMANITARIAN LAW, INTERNATIONAL COMMITTEE OF THE RED CROSS* (2005) [hereinafter ICRC]; DAVID H. OTT, *PUBLIC INTERNATIONAL LAW IN THE MODERN WORLD* 13 (1987); Roger S. Clark, *Treaty and Custom, in INTERNATIONAL LAW, THE INTERNATIONAL COURT OF JUSTICE AND NUCLEAR WEAPONS* 171 (Laurence Boisson de Chazournes & Philippe Sands eds., 1999); Jack L. Goldsmith & Eric A. Posner, *A Theory of Customary International Law*, 66 U. CHI. L. REV. 1113 (1992); J. Patrick Kelly, *The Twilight of Customary International Law*, 40 VA. J. INT’L L. 449 (1999); W. Michael Reisman, *The Cult of Custom in the Late 20th Century*, 17 CAL. W. INT’L L.J. 133 (1987) (identifying a resurgence of CIL); Anthea Elizabeth Roberts, *Traditional and Modern Approaches to Customary International Law: A Reconciliation*, 95 AM. J. INT’L L. 757 (2001); Paul Rubenstein, *State Responsibility for Failure to Control the Export of Weapons of Mass Destruction*, 23 CAL. W. INT’L L.J. 319 (1993).

112. Statute of the International Court of Justice art. 38(1)(b), June 26, 1945, 59 Stat. 1055, T.S. No. 993 [hereinafter ICJ Statute].

113. See generally S.S. “*Lotus*” (Fr. v. Turk.), 1927 P.C.I.J. (ser. A) No. 10, at 30 (Sept. 7) (surveying relevant international practice and finding no principle of international law precluding Turkey from instituting prosecution of French ship captain); *Asylum* (Colom. v. Peru),

States.<sup>114</sup> Although CIL is often less “definite” than treaty law—it can be difficult to ascertain the precise content of a putative CIL rule, to determine that it has actually achieved the status of CIL, and to know on which States it is binding—it is nonetheless an important, dynamic, and prominent component of the international legal structure, routinely ad-duced and applied with decisive effect.<sup>115</sup>

In the words of the American Law Institute’s Restatement of the Foreign Relations Law of the United States, CIL emerges “from a general and consistent practice of states, followed by them from a sense of legal obligation.”<sup>116</sup> Two elements must thus be established to create a binding rule: the “objective” criterion seeks a widespread, longstanding pattern of concordant state practice; the “subjective” or “psychological” criterion seeks to attribute that pattern of practice to a “sense of obligation,” rather than merely to habit, courtesy, indifference, or political expediency.

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1950 I.C.J. 266, 277 (Nov. 20) (finding that “it is not possible to discern in all this any constant and uniform usage, accepted as law” establishing Colombia’s claim regarding grant of asylum); *Right of Passage (Port. v. India)*, 1960 I.C.J. 6, 39–43 (Apr. 12) (holding that a constant and uniform local practice permitted free passage of private persons and goods—but not of armed forces or police—across Indian territory).

114. See, e.g., *Ware v. Hylton*, 3 U.S. (6 Dall.) 199 (1796); *Sosa v. Alvarez-Machain*, 542 U.S. 692 (2004); *Filartiga v. Pena-Irala*, 630 F.2d 876 (2d Cir. 1980); *The Paquete Habana*, 175 U.S. 677 (1900).

115. A similar conclusion may be reached via a different jurisprudential route: In addition to customary international law (CIL), “general principles of law” are recognized as an authoritative source for the ICJ and other decision-makers. ICJ Statute, *supra* note 112, art. 38(1)(c); RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102.4, cmt. L (1987). Among those general principles is the obligation not to injure other States. See *infra* notes 199–215 and accompanying text. The United Nations Survey of International Law concluded that “[t]here has been general recognition of the rule that a State must not permit the use of its territory for purposes injurious to the interests of other States in a manner contrary to international law.” Memorandum, The Secretary-General, Survey of International Law in Relation to the Work of Codification of the International Law Commission, ¶ 57, U.N. Doc. A/GN.4/1/Rev.I (Feb. 10, 1949). Judge Lauterpacht of the ICJ concluded that this maxim is “one of those general principles of law applicable under Article 38(1)(c) of the Statute of the International Court of Justice.” RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES pt. VI, intro. note (1987); see also Harry H. Almond, Jr., *General Principles of Law—Their Role in the Development of the Law of Outer Space*, 57 U. COLO. L. REV. 871 (1985); Niels Petersen, *Customary Law Without Custom? Rules, Principles, and the Role of State Practice in International Norm Creation*, 23 AM. U. INT’L L. REV. 275 (2008) (differentiating between CIL and general principles of law).

116. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102.2 (1987); see also ICRC, *supra* note 111, at xxxi–xlii; U.S. DEP’T ARMY, FIELD MANUAL 27–10: THE LAW OF LAND WARFARE ¶ 6 (1956) [hereinafter ARMY FIELD MANUAL 27–10].

### A. The Objective Element

The objective element of CIL does not demand absolute unanimity or perfect consistency in the emerging custom, but the more States participate, the better, and the behavior of the “leading” States (those that are most active in the particular field, or most affected by it) will count extra.<sup>117</sup> As the ICJ observed in the *Nicaragua vs. United States* case in 1986,

The Court does not consider that, for a rule to be established as customary, the corresponding practice must be in absolutely rigorous conformity with the rule. In order to deduce the existence of customary rules, the Court deems it sufficient that the conduct of States should, in general, be consistent with such rules, and that instances of State conduct inconsistent with a given rule should generally have been treated as breaches of that rule, not as indications of the recognition of a new rule.<sup>118</sup>

In addition, the traditional requirement that the observed pattern of state behavior must be “longstanding” has also been tempered in the modern era. If the consensus among States is truly widespread and deep, its relatively short duration may be overlooked. In particular sectors where technology emerges rapidly, or where States quickly alter their policies and attitudes, the oxymoron “instant customary law” may be installed. A leading illustration of that phenomenon, according to the Restatement, was the rapid crystallization of a rule allowing coastal States to exert exclusive claims to the resources of the contiguous oceanic continental shelf.<sup>119</sup> As the ICJ explained in the 1969 *North Sea Continental Shelf Cases*, “the passage of only a short period of time is

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117. In the 1969 *North Sea Continental Shelf Cases*, the ICJ indicated that the criteria for evaluating state practice for forming a CIL rule include: (a) the amount of time the rule has been adhered to; (b) the number and type of States adhering to the rule (especially States having a special interest in the subject); and (c) the uniformity of the practice. *North Sea Continental Shelf* (F.R.G. v. Neth.), 1969 I.C.J. 3, 41–45 (Feb. 20); see also ICRC, *supra* note 111, at xxxviii; John B. Bellinger, III & William J. Haynes II, Letter to Jacob Kellenberger, Nov. 3, 2006, at 3 (conveying initial reactions of the U.S. government to the ICRC study of Customary International Humanitarian Law); Claude C. Emanuelli, *Comments on the ICRC Study on Customary International Humanitarian Law*, 2006 CAN. Y.B. INT'L L. 437, (critiquing ICRC methodology, and noting that the question of what constitutes “state practice” is always controversial); Ramey, *supra* note 7, at 69–70.

118. *Military and Paramilitary Activities in and Against Nicaragua* (Nicar. v. U.S.), 1986 I.C.J. 14, 98 (June 27).

119. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 reporters' note 2 (1987) (noting the traditional requirement that a rule of CIL could be established only over an extended period of time, but that this rule began to lose its force after World War II, when improved international communications made the emerging practices of States well-known more quickly). *Id.*

not necessarily, or of itself, a bar to the formation of a new rule of customary international law.”<sup>120</sup>

To evaluate the relevant behavior of States, CIL contemplates the full range of a country’s words as well as deeds, silences as well as inactions, and oral as well as written statements. Diplomatic communications, comments in public fora, and, of course, overt exertions of military, economic, or political power are all taken into account. The relevant actions may be unilateral or undertaken in concert with others. Silence or passivity, however, is often difficult to construe; should it be interpreted as acquiescence to the emerging norm, or as a failure to notice it?<sup>121</sup>

Most of the relevant state behaviors would ordinarily be exerted by a country’s executive branch, but in suitable circumstances, the legislative and judicial branches can play their roles, too. Sometimes, even non-state actors (the United Nations or non-governmental organizations such as the International Committee of the Red Cross) can undertake actions that could contribute to the growth of CIL. These days, some very active States promulgate so much internationally relevant “behavior” that other countries must attend diligently to the torrent, lest their failure to respond be interpreted as acceptance.<sup>122</sup>

### B. The Subjective Element

The subjective element of CIL (the “*opinio juris sive necessitatis*”) is often even more problematic. First, it can be impossibly difficult to discern *why* a particular State has behaved in a particular way—was it “from a sense of legal obligation” or for other lesser motivations? States do not routinely announce their motivations, and multiple, conflicting factors may contribute to a national decision-making process.<sup>123</sup>

At a deeper level, this psychological factor poses something of a conundrum—it appears that an emerging pattern of state behavior counts as CIL only if States behave in that concordant fashion out of a sense that they are *already* legally obligated to do so. If they instead perceive themselves to be undertaking merely voluntary behaviors, from which

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120. North Sea Continental Shelf, 1969 I.C.J., at 44.

121. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 cmt. B (1987); ICRC, *supra* note 111, at xxxii. *But see* Bellinger & Haynes, *supra* note 117, at 1–2 (critiquing ICRC methodology for assessing sources of CIL).

122. ICRC, *supra* note 111, at xxxiv–xxxv.

123. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 cmt. C (1987); Bellinger & Haynes, *supra* note 117, at 2.



they remain legally free to depart at any point without incurring international legal liability, then when can a CIL standard emerge?<sup>124</sup>

One path for escaping that conundrum is to suggest that a CIL norm may evolve slowly or gradually, as the pattern of state behavior creeps from “voluntary” toward “compulsory.” That is, an individual State may act in a particular way purely for self-interested reasons, with no suggestion that it (or others) would be obligated to do so. But perhaps other States, appreciating the wisdom and virtue of that behavior, begin to similarly adopt it as their own. And perhaps over time that emerging “pattern” of behavior is followed (still voluntarily) by additional States, gradually accreting into a common thread. At some point, States may come to “expect” that others will continue to follow the pattern; they may come to “rely” on that continuity; they may eventually come to feel that it is “legitimate” to do so and “improper” to depart. Eventually, the conformity may rise to the level where the international consensus is deemed to have “crystallized” or “hardened” into a binding rule of CIL, departure from which is then no longer simply “unwelcome” or “regrettable,” but positively “illegal.” Any particular State may be surprised to discover that what had begun as purely a voluntary and individual practice had ripened into a binding and universal international rule, but that is the law-making process of CIL.<sup>125</sup>

### C. *Weighing the Objective and Subjective Elements of Customary International Law*

Scholars debate the relative importance of the objective and subjective elements of CIL. Some “positivists” argue for emphasis on the naked facts of state behavior, focusing strictly on the actions that States undertake in the world, discounting any inquiry into the underlying rationale, justification or motivation. For example, the International Law Association in 2000 adopted a “Statement of Principles” espousing that postulate, asserting that “it is not *usually* necessary to demonstrate the existence of the subjective element before a customary rule can be said to have come into being.”<sup>126</sup>

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124. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 reporters’ note 2 (1987); Sienho Yee, *The News That Opinio Juris “Is Not a Necessary Element of Customary [International] Law” Is Greatly Exaggerated*, 2000 GERMAN Y.B. INT’L L. 227.

125. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 reporters’ note 2 (1987).

126. Int’l Law Ass’n [ILA], Comm. on Formation of Customary Int’l Law, *Statement of Principles Applicable to the Formation of General Customary International Law: Report of the Sixty-Ninth Conference, London*, 712, 713 (2000); see also Yee, *supra* note 124.

Some prominent case law demonstrates a similar bent. In *The Paquete Habana*, the U.S. Supreme Court in 1900 first articulated the principle that

[i]nternational law is part of our law, and must be ascertained and administered by the courts of justice of appropriate jurisdiction, as often as questions of right depending upon it are duly presented for their determination. For this purpose, where there is no treaty, and no controlling executive or legislative act or judicial decision, resort must be had to the customs and usages of civilized nations.<sup>127</sup>

To ascertain the relevant rights in that case (involving the seizure as prizes of war of two fishing vessels operating out of Havana at the outbreak of the Spanish-American War), the Court surveyed some 500 years of maritime history to discern whether a pattern of state practice had become sufficiently entrenched to exempt from seizure certain categories of coastal fishing ships. In that painstaking exegesis, the Court inquired into the cognizable actions of England, Japan, and other States, but commented little on their articulated reasons or the perception of legal compulsion justifying those externally observable actions.<sup>128</sup>

In contrast, the Restatement and most other contemporary authorities continue to emphasize the subjective as well as the objective elements, differentiating mere habit or comity from binding law. In fact, some authorities would elevate the subjective element to primacy, suggesting that if States generally *believe* something to be illegal (or permitted, or mandatory, depending on how the norm is phrased) it is less important that their actual *behavior* conform to that standard.<sup>129</sup>

To that effect is *Filartiga v. Pena-Irala*,<sup>130</sup> the famous Second Circuit 1980 Alien Tort Claims Act case that opened U.S. courts to human rights suits seeking redress for state-sponsored torture conducted in a foreign land. There, the court relied on “the universal condemnation of torture” in numerous global and regional human rights treaties and on “the renunciation of torture as an instrument of official policy” in the national constitutions of at least fifty-five States.<sup>131</sup> On the other hand, the court had to acknowledge that this outlawry of torture was “in principle if not

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127. *The Paquete Habana*, 175 U.S. 677, 700 (1900).

128. *Id.* at 686–710.

129. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 cmt. C (1987); Bin Cheng, *United Nations Resolutions on Outer Space: “Instant” International Customary Law?*, 5 IND. J. INT’L L. 23, 36 (1965).

130. *Filartiga v. Pena-Irala*, 630 F.2d 876 (1980).

131. *Id.* at 880.

in practice,”<sup>132</sup> and it dropped a footnote explaining that “[t]he fact that the prohibition of torture is often honored in the breach does not diminish its binding effect as a norm of international law.”<sup>133</sup> In this view, the fact that States generally proclaim the illegality of torture outweighs, for purposes of adducing a CIL standard, the fact that many of them continue to employ it as a frequent tool of national policy.

The ICJ continues to espouse both elements as required for CIL.<sup>134</sup> In its remarkable 1996 Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons,<sup>135</sup> the ICJ observed that nuclear weapons had not been employed in combat since 1945, a span of half a century of zero use. (Eight countries have conducted 2051 explosive tests of nuclear weapons since 1945.)<sup>136</sup> Despite that objective pattern of restraint, the court was unable to find a CIL prohibiting nuclear weapons, because the *opinio juris* element was absent. The nuclear weapons-possessing States had asserted that, pursuant to the policy and practice of deterrence, they had always reserved the legal right to threaten, and even to use, their nuclear weapons in the exercise of self-defense. In addition, numerous treaties regulate—but manifestly do not purport to ban completely—nuclear weapons, an implicit acknowledgement of their lawfulness. As the ICJ characterized the argument, the abstention from use of nuclear weapons “is not on account of an existing or nascent custom but merely because circumstances that might justify their use have fortunately not arisen.”<sup>137</sup>

#### D. Customary International Law and Treaties

Although treaties and customary international law norms are of equivalent legal weight, there is one sense in which CIL is even more

132. *Id.*

133. *Id.* at 884 n.15.

134. Military and Paramilitary Activities in and Against Nicaragua (Nicar. v. U.S.), 1986 I.C.J. 14, 109 (June 27) (holding that “[e]ither the States taking such action or other States in a position to react to it, must have behaved so that their conduct is ‘evidence of a belief that this practice is rendered obligatory by the existence of a rule of law requiring it’” (quoting the North Sea Continental Shelf (F.R.G. v. Neth.), 1969 I.C.J. 3, 44 (Feb. 20)); Continental Shelf (Libya v. Malta), 1985 I.C.J. 13, 29–30 (June 3) (“It is of course axiomatic that the material of customary international law is to be looked for primarily in the actual practice and *opinio juris* of States.”); ICRC, *supra* note 111, at xxxii (asserting “there can be no customary law without confirmation of the rule in state practice”); Petersen, *supra* note 115, at 3 (arguing that the ICJ in practice favors analysis of the subjective element of CIL, disregarding the objective); Ramey, *supra* note 7, at 69–70 (adopting the “classic” approach to assessing CIL, requiring both state practice and a belief that the practice is obligatory).

135. Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226 (July 8).

136. Arms Control Ass’n, *Fact Sheet: The Nuclear Testing Tally* (2007), available at <http://www.armscontrol.org/system/files/NuclearTestingTally.pdf> (last visited July 17, 2009).

137. Legality of Threat or Use of Nuclear Weapons, 1996 I.C.J. at 254.

assertive and far-reaching than the written instruments. That is, once a CIL norm is established (through the above-described arcane objective and subjective criteria), it becomes automatically binding on *all* States—even those that did not participate in the emerging pattern, that may not have been fully cognizant that a trend was developing, and that may not be fully supportive of the rule, if they took the occasion to think about it seriously. In fact, new countries (*e.g.*, former colonies) that were not even in existence at the time a prior CIL norm had emerged are nonetheless bound by it—a new State may have some ability to pick and choose which *treaty* obligations of its former regime should continue to apply to the new entity, but it is generally deemed to have consented automatically to the entire corpus of CIL that exists on the date of its independence.<sup>138</sup>

The only exemption from CIL is available to a “persistent objector.” That is, a State that publicly and consistently repudiates a newly arising norm of CIL, from the time that it emerges through its effectuation as law, is not bound by it. There are, however, few examples of successful invocation of this exception; it is rare for a State to be sufficiently prescient and conscientious to preserve its autonomy as a new CIL rule advances.<sup>139</sup>

In contrast, of course, any State may avoid any treaty obligation simply by deciding not to sign or ratify it. Treaties rarely directly implicate the rights and responsibilities of non-parties, and passivity or inaction therefore results in the absence of legal responsibility. With CIL, on the other hand, the “default position” is reversed.

The relationship between treaty and CIL is also intricate with respect to sequencing. That is, sometimes CIL can precede, and lead to, a treaty: if the world develops a growing sense that a particular form of state behavior ought to be obligatory (or permitted, or prohibited), that consensus can generate, as we have seen, a CIL norm. Later (or simultaneously) that same sentiment can inspire countries to negotiate a treaty, reducing the inchoate CIL rules to explicit written text.

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138. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102, reporters' note 2 (1987) (providing that newly independent States are bound by existing CIL).

139. *Id.* § 102 cmt. d; Jonathan I. Charney, *The Persistent Objector Rule and the Development of Customary International Law*, 1985 BRIT. Y.B. INT'L L. 1; Martin D. Dupuis et al., *The Sixth Annual American Red Cross-Washington College of Law Conference on International Humanitarian Law: A Workshop on Customary International Law and the 1977 Protocols Additional to the 1949 Geneva Conventions*, 2 AM. U. J. INT'L L. & POL'Y 415, 444 (1987) [hereinafter *Conference on International Humanitarian Law*] (remarks of Theodor Meron); Ted L. Stein, *The Approach of the Different Drummer: The Principle of the Persistent Objector in International Law*, 26 HARV. INT'L L.J. 457 (1985).

Alternatively, sometimes the treaty predates, and leads to, the CIL. That is, the articulation and implementation of a multilateral treaty, especially one that is intended to attract very broad participation and does, in fact, succeed in inspiring near-universal affiliation, can itself become evidence of concordant state practice and a sense of *opinio juris*. In that way, a particular accord may reflect the general consensus of the world community and pass, in whole or in part, into CIL. Of course, not all treaties are automatically transformed into CIL in this fashion; some accords are intended to be "contractual" in nature, imposing obligations only among the participants, while others may be characterized as "law-making" treaties, which more broadly attempt to promulgate rules that will be effective, sooner or later, for the entire world. In the latter situation, the treaty norms can eventually become binding on all countries (except, of course, any persistent objector), including those that had deliberately or unconsciously stayed away from the treaty itself. Strictly speaking, the treaty itself is not binding on non-parties, but the *contents* of the treaty, to the extent that they have come to meet the criteria for CIL, can become obligatory for all.<sup>140</sup>

This relationship necessarily implies that a particular norm could be simultaneously a rule of CIL and a rule of treaty law; either expression could be binding (or not) on any particular State. The drafting and conclusion of a treaty do not extinguish the CIL status of the underlying norm, nor does the emergence of a new CIL rule displace a prior treaty that had incorporated the same standards.<sup>141</sup>

Where a treaty and a CIL rule *conflict*, the jurisprudence becomes a bit more complicated. In general, a "last-in-time" rule prevails, holding that the newest pronouncement provides the binding law. Thus, where a new CIL norm emerges, it will displace, to the extent of any antagonism, the rules written into pre-existing treaties. Conversely, a new treaty can extinguish a prior CIL rule, at least among parties to the accord. Obviously, these sorts of gross contradictions between broad, global legal

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140. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 cmt. i, reporters' note 5 (1987); ICRC, *supra* note 111, at xlii; Clark, *supra* note 111, at 172; *Conference on International Humanitarian Law*, *supra* note 139, at 440 (remarks of the moderator).

141. Military and Paramilitary Activities in and Against Nicaragua (Nicar. v. U.S.), 1986 I.C.J. 14, 92-97 (June 27) (explaining that even where court was unable to apply treaty law to resolve a dispute, similar or identical rules of CIL were still applicable); *see also* Vienna Convention on the Law of Treaties art. 38, May 23, 1969, 1155 U.N.T.S. 331, 8 I.L.M. 679 ("[N]othing . . . precludes a rule set forth in a treaty from becoming binding upon a third State as a customary rule of international law, recognized as such.").

principles are rare, but they can occur, and they carry those discernable consequences.<sup>142</sup>

*E. The U.N. General Assembly, the Conference on Disarmament, and the Articulation of Customary International Law*

The United Nations General Assembly and the Conference on Disarmament are not listed on the usual rosters of “sources of public international law.” Unlike, for example, the United Nations Security Council<sup>143</sup> and the ICJ,<sup>144</sup> the UNGA and the CD do not benefit from Member States’ standing commitments to observe the bodies’ resolutions as binding law. Instead, their enactments are characteristically cast as recommendations or exhortations, urging States to conform their behaviors to the articulated norms, but they do not, in themselves, carry the weight of international law.

On the other hand, the UNGA (and, within the specialized sphere of arms control, the CD) can play valuable roles in helping to foster the growth of CIL. The UNGA serves as the most convenient forum within which countries assert their views about the wide range of world events—assertions that can directly contribute to both the objective and subjective criteria founding CIL. A UNGA resolution—depending on how it is worded, what the drafters’ intentions are, and how overwhelmingly it is supported—can constitute strong evidence of the existence and content of a putative CIL rule.<sup>145</sup>

The CD, likewise, serves as the world’s foremost venue for collecting and displaying States’ views about arms control norms. Where States affirmatively decide to take advantage of this forum for expressing their opinions about weapons-related behaviors that they find unacceptable, requisite, or laudatory, those proclamations, too, can contribute directly to CIL, whether or not they simultaneously lead directly to crafting a new treaty. In this way, the CD—as does the UNGA in considering the broader panorama of issues—voices the expectations of the world community regarding the current and possible future state of the CIL of weaponry.

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142. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 cmt. j, reporters’ note 4 (1987).

143. See U.N. Charter art. 25 (providing that parties “agree to accept and carry out the decisions of the Security Council”).

144. See *id.* art. 94 (providing that each party “undertakes to comply with the decision of the International Court of Justice in any case to which it is a party”).

145. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 cmt. g, reporters’ note 2 (1987); *id.* § 103 cmt. c, reporters’ note 2; Clark, *supra* note 111, at 176.

### F. *The Customary International Law of Space*

Outer space illustrates particularly well many of the principles and practices described above. First, regarding the sometimes swift pace for the evocation of CIL, in response to the world community's demand for new global rules in fast-breaking areas, the practices of States in the 1950s regarding satellite overflights provide a leading illustration of the concept of "instant customary international law."<sup>146</sup>

That is, before the first Sputnik flights (and the soon-to-follow U.S. counterparts) no one could have known what the rules would be regarding outer space transits. Would the overflown country have the right to protest, to demand that its permission must be obtained, and to charge a fee for satellites that passed overhead? That structure of rights does describe (in very short form) the relationships that obtain regarding national jurisdiction over the superjacent airspace—a State's control over its land territory is assimilated to its air buffer, and other States are not privileged to enter national airspace without permission, which may be denied, conditioned, or granted only at a fee. But does the national power over airspace stretch upwards indefinitely, to embrace as well the sector of outer space that lies directly overhead?<sup>147</sup>

In the opening phases of the Space Age, the United States and the Soviet Union did not, in fact, request permission from the States that were overflown (and shortly thereafter made the subject of remote reconnaissance) by satellites. The subjacent States—fully cognizant, of course, of the existence of these pioneer spacecraft—did not protest or complain; indeed, the world robustly applauded the scientific achievements. Perhaps the other countries, lulled by the peaceful and non-intrusive nature of the first satellites, were largely unaware of the full extent of the potential rights they were sleeping on, and insufficiently

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146. Bin Cheng, *supra* note 129, at 23; Joanne Irene Gabrynowicz, *The Outer Space Treaty and Enhancing Space Security*, in *BUILDING THE ARCHITECTURE FOR SUSTAINABLE SECURITY*, *supra* note 15, at 113, 118–19; Ramey, *supra* note 7, at 67–68; Vladlen S. Vereshchetin & Gennady M. Danilenko, *Custom as a Source of International Law of Outer Space*, in *SPACE LAW*, *supra* note 20, at 113.

147. 2008 ANNUAL REPORT TO CONGRESS, *supra* note 28, at 147–50; GALLAGHER & STEINBRUNER, *supra* note 76, at 7–10 (describing early U.S.-Soviet dialogue regarding the legality of satellite overflights); DELBERT R. TERRILL, JR., *THE AIR FORCE ROLE IN DEVELOPING INTERNATIONAL OUTER SPACE LAW* (1999); Paul G. Dembling & Daniel M. Arons, *The Evolution of the Outer Space Treaty*, in *SPACE LAW*, *supra* note 20, at 151; Note, *National Sovereignty of Outer Space*, 74 HARV. L. REV. 1154 (1961); M.J. Peterson, *The Use of Analogies in Developing Outer Space Law*, 51 INT'L ORG. 245 (1997); Tannenwald, *supra* note 20; Larry M. Wortzel, *The Chinese People's Liberation Army and Space Warfare: Emerging United States-China Military Competition*, Address to American Enterprise Institute for Public Policy Research, at 5 (Oct. 17, 2007), available at <http://www.aei.org/paper/26977> (last visited June 30, 2009).

focused on the nature of the novel legal regime that was being surreptitiously generated.<sup>148</sup>

In any event, the failure to object to the superpowers' conspicuous activity, and the tacit acceptance of the proposition that outer space, unlike airspace, was free for transit without permission, tolls, or regulation by the overflowed State, quickly crystallized a new CIL set of rules. Within only a few years, the regime was established—and it was distinctly more advantageous to the high-technology users of the resource than would be a simple extension upward of the sovereign control of the land State. Unlike in *The Paquete Habana*,<sup>149</sup> there was no need for incremental state practice over 500 years to effectuate a new rule; CIL can move quite quickly when sufficiently prodded.<sup>150</sup>

Second, the world community's experience with outer space law illustrates the sometimes tricky relationship between treaty and custom. That is, the OST was opened for signature on January 27, 1967; it was swiftly ratified, and entered into force for its parties on October 10, 1967. But many of the treaty's provisions, including most of the key "constitutional" postulates that characterize the realm, had likely been established as CIL well before 1967.<sup>151</sup>

It is difficult to be certain exactly what parts of the legal regime were actually institutionalized as CIL, and on what date those rules would have become operative, because there was no authoritative judgment on point from the ICJ or any other competent tribunal. But we can confidently assert that both law-making processes (treaty and custom) were engaged during the 1950s and 1960s, that they were advancing

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148. Note, *National Sovereignty of Outer Space*, *supra* note 147.

Even after the creation of the two alternative legal regimes (one for air and a substantially different one for space), uncertainty has persisted about the precise dividing line between them. No consensus has developed among international authorities about the altitude at which the law of air ends and the law of space begins to apply. See Raymond J. Barrett, *Outer Space and Air Space: The Difficulties in Definition*, AIR U. REV., May–June 1973, available at <http://www.airpower.au.af.mil/airchronicles/aureview/1973/may-jun/barrett.html> (last visited June 30, 2009); Vladimir Kopal, *The Question of Defining Outer Space*, in SPACE LAW, *supra* note 20, at 129; Ramey, *supra* note 18, at 745, 752; Caesar Voute, *Boundaries in Space*, in PEACEFUL AND NON-PEACEFUL USES OF OUTER SPACE, *supra* note 28, at 19–35.

149. *The Paquete Habana*, 175 U.S. 677 (1900).

150. J.F. McMahon, *Legal Aspects of Outer Space: Recent Developments*, in SPACE LAW, *supra* note 20, at 189; see also *The Paquete Habana*, 175 U.S. 677; GALLAGHER & STEINBRUNER, *supra* note 76, at 42 (reporting that lawyers for the U.S. Department of Defense have argued that other countries' failure to object to the American interpretation of the Outer Space Treaty—an interpretation that permits all "non-aggressive" uses of space as being "peaceful"—quickly rendered that interpretation an accepted part of CIL); Mejia-Kaiser, *supra* note 57, at 31 (inquiring whether a new norm of CIL is emerging that would require States to adopt procedures to mitigate the creation of new space debris).

151. Gabrynowicz, *supra* note 146, at 113–14; Ramey, *supra* note 7, at 71; Vereshchetin & Danilenko, *supra* note 146, at 116, 123 (discussing fundamental principles and rules of outer space law that were created by CIL before conclusion of the Outer Space Treaty).



substantively similar legal rules, and that at least to some extent, the CIL avenue was operating more rapidly than the treaty mechanism.<sup>152</sup>

Remarkably, the CIL version of the law of outer space would achieve even more comprehensive geographic coverage than the treaty version. Half of the countries in the world have not yet gotten around to ratifying the OST; even larger cohorts have not acted to affiliate themselves with the other important space-related instruments. In contrast, all countries would be bound by the CIL of outer space; it is hard to imagine any “persistent objectors” who have exempted themselves from any aspect of the now-entrenched custom, and any new States that emerge onto the world scene would automatically be covered by the body of space-related CIL, even if they do not affirmatively join the treaties.

Third, outer space also illustrates the law-making role of the UNGA. When the legal regime for space was first emerging, many countries opted to employ the UNGA as the most apt mechanism for expressing themselves about the putative rules for exoatmospheric interaction; their statements in this “global town meeting” carry weight in the evaluation of emerging CIL. Successive UNGA resolutions, especially the 1963 Outer Space Declaration<sup>153</sup> (which initiated and expressed many of the principles that were later cast into treaty vocabulary in the OST) were prepared with a solemnity (and adopted via unanimous vote) suggesting a conscious legislative function. As the Restatement notes,

[t]he Outer Space Declaration, for example, might have become law even if a formal treaty had not followed, since it was approved by all, including the principal “space powers.” . . . A

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152. See U.S. Dep’t of State, *Fact Sheet: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, <http://www.state.gov/www/global/arms/treaties/space1.html#2> (last visited June 30, 2009) (explaining that negotiation and conclusion of the Outer Space Treaty were somewhat delayed between 1959 and 1962 because the United States and the Soviet Union—while generally agreeing on the content of the principles that should govern activities in outer space—disagreed on whether to link progress on outer space to progress on other contemporary disarmament issues); see also Bin Cheng, *supra* note 129, at 43 (quoting the U.S. delegate to United Nations as stating that the American government “considered that the legal principles contained in the draft Declaration [by the UNGA of principles governing the activities of States in space] reflected international law as accepted by Members of the United Nations,” and noting that other leading States issued similar statements, and that the contents of the declaration therefore quickly became established as CIL); Garthoff, *supra* note 21.

153. Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, U.N. GAOR, 18th Sess., Supp. No. 15, U.N. Doc. A/5515 (Dec. 13, 1963). Much of the language of this UNGA resolution was adopted directly into the text of the Outer Space Treaty; see also Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, G.A. Res. 2222, U.N. GAOR, 21st Sess., U.N. Doc. A/RES/21/2222 (Dec. 19, 1966) (commending the Outer Space Treaty and hoping for the widest possible adherence to it).

spokesman for the United States stated that his Government considered that the Declaration “reflected international law as accepted by the members of the United Nations,” and both the United States and the U.S.S.R. indicated that they intended to abide by the Declaration.<sup>154</sup>

Of course, not every enactment of the UNGA (still less, the actions of the CD) is automatically entitled to the status of CIL, but the elusive mechanisms of customary law-making sometimes do repose special respect to the weightiest resolutions of those global instrumentalities.<sup>155</sup>

### *G. The Customary International Law of ASATs*

We thus come to the fundamental question of what, if any, restrictions general CIL might already impose on ASAT weaponry. The standard two-pronged CIL inquiry asks (on the objective level) what have States have actually done about ASAT testing and use, and (on the subjective level) whether they have felt a sense of obligation driving them toward that pattern.

Regarding observable behavior, the “box score” noted above reveals a surprisingly low level of ASAT activity. Tests of satellite-killers in outer space have averaged approximately one per year since the space age began, but the vast bulk of that activity occurred more than twenty-five years ago. Since 1985, there have been (depending on how one counts the ambiguous or incompletely documented cases) one kinetic interceptor test in space by the United States (in 2008); one high-energy laser ASAT test by the United States (in 1997); four interceptor tests by China (in 2005–2007); two or three directed energy ASAT events by China (in 2006); and no tests of either sort by the Soviet Union or Russia. (There may have been additional instances of non-destructive tests that have not been publicly identified.)

Regarding the other verb of special interest, no State has ever *used* its ASAT system in hostilities or in a time of crisis against the spacecraft of another country.

Two immediate objections to the significance of this box score must be noted. First, admittedly, relatively few States have had the sheer capacity for undertaking ASAT tests or uses. Evidence of States generally refraining from pursuing a contested activity would surely count for less,

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154. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 102 reporters’ note 2 (1987); Andrei D. Terekhov, *U.N. General Assembly Resolutions and Outer Space Law*, in *SPACE LAW*, *supra* note 20, at 101, 103–05.

155. Vladimir Kopal, *The Role of United Nations Declarations of Principles in the Progressive Development of Space Law*, in *SPACE LAW*, *supra* note 20, at 85; Terekhov, *supra* note 154.

if the abstention were due to technological or financial impossibility. But in fact, many more States could have effectively pursued ASAT mechanisms, if they had decided to do so. Many Members of the European Union, for example, individually or collaboratively through the European Space Agency, as well as Japan, surely could have devoted themselves to articulation of ASAT interceptor capabilities over the years—the know-how for launching peaceful civilian satellites is not so impossibly different from the weapons applications, and forty-seven States now undertake some level of autonomous space activity.<sup>156</sup> James Clay Moltz has estimated that any of a “handful” of countries other than the United States and the Soviet Union could have undertaken calamitous ASAT tests or operations in space, and that today, about two dozen countries would have the ability to render vast expanses of space unusable by others for an indefinite period of time, via capricious and indiscriminate kinetic energy ASATs.<sup>157</sup>

The potential for directed energy ASAT weaponry may be even more widely proliferated—dozens of countries have access to lasers of sufficiently high quality that weapons applications would not be impossibly out of reach.<sup>158</sup>

A second partial admission would be an acknowledgement that some of the explanation for the absence of any uses of ASAT systems in combat to date has been simply because the three ASAT-possessing countries have never yet found it necessary to employ those dramatically new devices. In all their recent wars, these States have discovered sufficiently robust other mechanisms to seize the military advantage over their opponents—ASAT systems simply would not have added measurably to the mix. When the Soviet Union/Russia was engaged in intense ground warfare in Afghanistan (1979–1989), for example, or in Chechnya (1994–1996 and again from 1999–2004), the nature of those conflicts, and Moscow’s one-sided technological edge, obviated any reason to exercise weapons in space. Similarly, when the United States fought in Vietnam (1965–1973), Iraq (1991 and 2003 to present), Kosovo (1999), or Afghanistan (2001 to present) the asymmetrical nature of each country’s military assets and vulnerabilities provided little occasion to shoot at objects in space.

Still, there were provocations. When the United States apprehended in 2001 that satellites operated by European or other foreign corporations or government agencies might acquire photographic or other data that could be useful to opposing forces in the Afghanistan conflict, the Pentagon was pressed to act. On that occasion, political suasion and market power sufficed to ensure that the most revealing imagery did not

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156. SPACE SECURITY 2008, *supra* note 2, at 13.

157. MOLTZ, *supra* note 20, at 5.

158. *Id.*

reach the enemy,<sup>159</sup> but a similar strategy was deemed too expensive to adopt regarding Iraq in 2003, when there were too many potential suppliers of satellite products to buy off. Who knows what might happen next time?<sup>160</sup>

More deeply, the mainstream view of the definition of general CIL also requires inquiry about the *opinio juris*, a demonstration that an affirmative “sense of legal obligation” was the subjective reason why States have refrained from testing or using ASATs. Frankly, the evidence for that proposition is weak.

The three ASAT-active States have certainly never indicated that any existing legal compulsion circumscribes their actions. They behave as though sheer national policy, rather than international law, is the driving force behind their space weapons programs. They have never exhibited any embarrassment about ASAT testing activities, and never suggested that it was improper or illegal to undertake the measures they have adopted. When they criticize each other’s ASAT experiments (which they routinely do), their rhetoric asserts that what the other country has done is unwise, unwelcome, adverse for international peace and security—but not illegal.

The U.S. reaction to the Chinese 2007 ASAT test, for example, labeled the event “regrettable,”<sup>161</sup> “very troubling,”<sup>162</sup> and

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159. *Id.*

160. Jessica West, *The Space Security Index: Changing Trends in Space Security and the Outer Space Treaty*, in CELEBRATING THE SPACE AGE, *supra* note 16, at 119, 123 (noting that many States, including North Korea, Taiwan, Pakistan, and Japan, are developing independent military reconnaissance satellites); Randy Barrett, *As War Nears, U.S. Officials Reluctant to Curb Sale of Satellite Images of Iraq*, SPACE NEWS, Mar. 24, 2003, available at [http://www.space.com/spacenews/archive03/iraqarch\\_032403.html](http://www.space.com/spacenews/archive03/iraqarch_032403.html) (last visited July 29, 2009) (stating that U.S. authorities are reluctant to return to “checkbook shutter control” because now there are too many potential suppliers of satellite imagery); Peter de Selding, *Europe Moves Ahead with Weather Satellite Blacklist*, SPACE NEWS, Jan. 9, 2006, available at [http://www.space.com/spacenews/businessmonday\\_060109.html](http://www.space.com/spacenews/businessmonday_060109.html) (last visited July 29, 2009) (stating that European government officials resisted, but ultimately acceded to, pressure from the U.S. government to prepare to deny data from weather satellites to hostile States during times of emergency); see also La Fleur, *supra* note 16, at 37; Hitchens, *supra* note 17, at 4 (noting that during the 2003 fighting in Iraq, many satellite operators acted as “good citizens,” voluntarily restricting sales of imagery that might have been valuable to opposing forces).

161. Christina Rocca, Ambassador, U.S. Permanent Representative to the United Nations, Prevention of an Arms Race in Outer Space, Statement to the Conference on Disarmament (Feb. 13, 2007), <http://www.usmission.ch/Press2007/0213PAROS.html> (last visited June 30, 2009) (expressing the U.S. government’s view that China’s 2007 ASAT test was “regrettable”); see also Marc Kaufman & Dafna Linzer, *China Criticized for Anti-Satellite Missile Test*, WASH. POST, Jan. 19, 2007, at A1 (quoting U.S. administration official saying: “It’s unfortunate that China is going down this path . . . . This sort of thing is such a throwback to the Cold War.”).

162. Hitchens, *supra* note 75, at 25 (quoting U.S. Department of State Deputy Spokesperson Tom Casey, who, referring to debris-creating ASAT tests, stated, “[w]e don’t believe anyone should be doing these kinds of activities”); Wade Boese, *Chinese Satellite Destruction Stirrs Debate*, ARMS CONTROL TODAY, Mar. 2007, at 27, 28 (quoting U.S. government officials

“destabilizing,”<sup>163</sup> and complained that it was “inconsistent with the spirit of cooperation that both countries aspire to in the civil space area”<sup>164</sup>—but conspicuously did not label it as “illegal” or “inconsistent with” any particular *legal* obligations. Conversely, after the United States’ shutdown of the USA-193 satellite in 2008, China warned that the event could threaten security in outer space, it asked that the U.S. government promptly share data about the debris created in the episode, and it cautioned that “China is continuously following closely the possible harm caused by the U.S. action to outer space security and relevant countries.”<sup>165</sup> Russia, for its part, described the Chinese event in negative terms, but declined to reprimand overtly Beijing. President Vladimir Putin also protested the U.S. test and blamed the United States for generating an arms race in space, but he did not directly sound “legality” as a theme in the criticism.<sup>166</sup>

Similarly, the 2006 U.S. National Space Policy directive focuses on ASATs as a matter of unilateral national choice, not international law. The truculent document may not overtly adopt a goal of procuring new ASAT capabilities, but the rationale behind its guidelines indicates a

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labeling the Chinese test as “very troubling,” “very worrisome,” “destabilizing” and “quite unpleasant”).

163. Boese, *supra* note 162, at 27–28.

164. SPACE SECURITY 2008, *supra* note 2, at 55 (quoting a U.S. official calling the Chinese test “inconsistent with the spirit of cooperation that both countries aspire to in the civil space area”); see also Richard Weitz, *U.S. Allies Criticize China’s Anti-Satellite Weapon Test; Media Notes Concerns About U.S. Space Policies*, 13 WMD INSIGHTS 2, 3 (2007) (quoting NASA spokesperson Jason Sharp as saying: “We believe China’s development and testing of such weapons is inconsistent with the constructive relationship that our presidents have outlined, including on civil space cooperation”).

165. Li Juqian, *Legality and Legitimacy: China’s ASAT Test*, 13 CHINA SECURITY 45 (2009); Eric Hagt, *The U.S. Satellite Shootdown: China’s Response*, BULL. ATOMIC SCIENTISTS, Mar. 5, 2008, available at <http://www.thebulletin.org/web-edition/features/the-us-satellite-shootdown-chinas-response> (last visited June 30, 2009); Thom Shanker et al., *An Errant Satellite Is Gone, but Many Questions Linger*, N.Y. TIMES, Feb. 22, 2008, at A21, available at <http://query.nytimes.com/gst/fullpage.html?res=9C01E0DF153BF931A15751COA96E9C8B63> (last visited June 30, 2009) (quoting Liu Jianchao, Spokesperson for the Chinese Foreign Ministry); Liu Jianchao, Chinese Foreign Ministry Spokesperson, Remarks on the U.S. Plan to Destroy Malfunctioning Satellite (Feb. 18, 2008), available at <http://www.fmprc.gov.cn/eng/xwfw/s2510/t408039.htm> (last visited June 30, 2009) (stating that the Chinese government is “highly concerned” over the U.S. shutdown of satellite USA-193 and has requested the United States “to fulfill its international obligations in earnest”); Liu Jianchao, Chinese Foreign Ministry Spokesperson, Regular Press Conference (Feb. 21, 2008), available at <http://www.fmprc.gov.cn/eng/xwfw/s2510/t409230.htm> (last visited June 30, 2009) (“China is closely following the possible damage to the security of outer space [caused by the event].”).

166. Hitchens, *supra* note 75, at 21–22; Richard Weitz, *Russia Walks a Fine Line in Assessing Chinese Anti-Satellite Weapon Test*, 13 WMD INSIGHTS 9 (2007); Tom Bowman, *China Protests After U.S. Shoots Down a Satellite* (NPR radio broadcast Feb. 21, 2008), available at <http://www.npr.org/templates/story/story.php?storyId=19246330> (last visited June 30, 2009).

clear intention of moving smartly in that direction, with no hesitancy over any potential CIL hurdle.<sup>167</sup>

States beyond those three have followed a similar pattern. In general, they disfavor ASATs—they frequently criticize or at least challenge the tests, such as China’s in 2007 and the United States’ in 2008—but they have not thought to assert that the activities are already illegal under CIL. Notably, the most frequent theme sounded by the critics is the need for a new treaty, or (especially recently) for some non-legally-binding regime that would pinch off ASAT development before it proceeds too far.<sup>168</sup>

After China’s ASAT adventure, the United Kingdom, Australia, Canada, Japan, Taiwan, India, South Korea, and the European Union seconded the U.S. protests.<sup>169</sup> Canada, for example, expressed its “strong concern” in three separate demarches;<sup>170</sup> Taiwan asserted that China’s test “would have [a] negative impact on peace in the Taiwan Strait and in the region”<sup>171</sup>; and Australia complained that the action “is not consistent with the traditional Chinese position of opposition to the militarization of outer space.”<sup>172</sup> India warned that “China’s ASAT test is definitely a concern for all countries with satellite launch capabilities.”<sup>173</sup> Several

167. U.S. National Space Policy, *supra* note 7. Likewise, in defending China against criticism about its 2007 ASAT test, Chinese Foreign Ministry Spokesperson Liu Jianchao stated:

This test was not directed at any country and does not constitute a threat to any country. What needs to be stressed is that China has always advocated the peaceful use of space, opposes the weaponization of space and an arms race in space. China has never participated and will never participate in any arms race in space.

Joseph Kahn, *China Confirms Space Test; Denies Intent to Intimidate*, N.Y. TIMES, Jan. 24, 2007, at A8 (quoting Spokesperson Liu Jianchao).

168. Hitchens, *supra* note 75, at 21–22; Mineiro, *supra* note 21, at 356; Weitz, *supra* note 164, at 2; *see also* Setsuko Aoki, *Japanese Perspectives on Space Security*, in COLLECTIVE SECURITY IN SPACE: ASIAN PERSPECTIVES, *supra* note 7, at 47; SPACE SECURITY 2008, *supra* note 2, at 55 (noting that several States warned that they might react to the Chinese test by increasing their own military operations in space, and several countries called for review of the Outer Space Treaty in order to prevent similar activities in the future).

169. Hitchens, *supra* note 75, at 21–22; Weitz, *supra* note 164.

170. Hitchens, *supra* note 75, at 21; *China Under Pressure to Explain Satellite Missile Strike*, AGENCE FRANCE-PRESSE, Jan. 20, 2007, available at [http://www.spacewar.com/reports/China\\_Under\\_Pressure\\_To\\_Explains\\_Satellite\\_Missile\\_Strike\\_999.html](http://www.spacewar.com/reports/China_Under_Pressure_To_Explains_Satellite_Missile_Strike_999.html) (last visited July 17, 2009).

171. *Id.*

172. *Australia Summons China Envoy Over Satellite*, AGENCE FRANCE-PRESSE, Jan. 19, 2007, available at [http://www.spacewar.com/reports/Australia\\_Summons\\_China\\_Envoy\\_Over\\_Satellite\\_999.html](http://www.spacewar.com/reports/Australia_Summons_China_Envoy_Over_Satellite_999.html) (last visited July 17, 2009).

173. Joshi, *supra* note 12, at 13; *China Missile Worries India*, TIMES OF INDIA (Mumbai), Jan. 20, 2007, available at <http://timesofindia.indiatimes.com/articleshow/1323752.cms> (last visited June 30, 2009).

national spokespersons highlighted the pernicious effects of the debris created by the event.<sup>174</sup>

Rüdiger Ludeking, then the European Union's Deputy Commissioner for Arms Control and Disarmament, speaking on behalf of the European Union at a plenary session of the Conference on Disarmament on January 24, 2007, said:

The EU is very concerned about a recent test of an anti-satellite weapon. Such a test is inconsistent with international efforts to avert an arms race in outer space. In this context the EU recalls the Outer Space Treaty and calls upon all signatory States to abide by their commitment to exercise their space activities in accordance with international law and in the interest of maintaining international peace and security.<sup>175</sup>

Tom Kelly, the spokesperson for Britain's Prime Minister Tony Blair, however, explicitly rejected any suggestion that the ASAT test constituted a violation of international law, stating:

We are concerned about the impact of debris in space and we expressed that concern. We don't believe that this does contravene international law. What we are concerned about, however, is the lack of consultation and we believe that this development of this technology and the manner in which this test was conducted is inconsistent with the spirit of China's statements to the UN and other bodies on the military use of space.<sup>176</sup>

The clear implication of these various comments is that the existing corpus of international law is inadequate to suppress the emerging

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174. Martin Sieff, *China Officially Announces Anti-Satellite Test Successful*, SPACEWAR, Jan. 24, 2007, available at [http://www.spacewar.com/reports/China\\_Officially\\_Announces\\_Anti\\_Satellite\\_Test\\_Successful\\_999.html](http://www.spacewar.com/reports/China_Officially_Announces_Anti_Satellite_Test_Successful_999.html) (last visited June 30, 2009).

175. Rüdiger Ludeking, Deputy Comm'r of Arms Control & Disarmament, German Fed. Gov't, Statement on Behalf of the European Union at the Conference on Disarmament (Jan. 24, 2007), available at [http://www.eu2007.de/en/News/CFSP\\_Statements/January/0123China.html](http://www.eu2007.de/en/News/CFSP_Statements/January/0123China.html) (last visited June 30, 2009).

176. *Britain Concerned By Chinese Satellite Shoot-Down*, AGENCE FRANCE-PRESSE, Jan. 19, 2007, available at [http://www.spacewar.com/reports/Britain\\_Concerned\\_By\\_Chinese\\_Satellite\\_Shoot\\_Down\\_999.html](http://www.spacewar.com/reports/Britain_Concerned_By_Chinese_Satellite_Shoot_Down_999.html) (last visited July 19, 2009); Richard Spencer, *U.K. Allies Join Protest at China Space Missile*, DAILY TELEGRAPH (London), Jan. 20, 2007, available at <http://www.telegraph.co.uk/news/worldnews/1540034/UK-allies-join-protest-at-China-space-missile.html> (last visited July 19, 2009); Paul Tighe & Takashi Hirokawa, *Japan, Australia Ask China to Explain Space Missile*, BLOOMBERG, Jan. 19, 2007, available at <http://www.bloomberg.com/apps/news?pid=20601087&sid=aQSEcxOJNoPI&refer=home> (last visited June 30, 2009).

threat—the remedy they propose is a fresh effort at treaty negotiation, not a re-vivified CIL.

One conspicuous (partial) exception—the rare sort of official statement that could carry weight for appreciating a CIL on space weaponry—came from Japan's Prime Minister Shinzo Abe in response to China's 2007 ASAT test. Asserting that the activity had violated existing international law (rather than simply calling for new law to regulate it), Abe said, "I believe it would not be in compliance with basic international rules such as the Outer Space Treaty."<sup>177</sup> He did not, however, elaborate that conclusion or overtly cite customary law as an independent authority.

Another shard of rhetoric that may help promote the notion of a CIL on ASATs came from G. Madhavan Nair, chair of the Indian Space Research Organization, who labeled China's test "unethical," because it created debris that endangers other satellites. He also asserted that India, too, had developed the capacity to destroy satellites, but had refrained from testing it in space because India adhered to international norms on the peaceful use of outer space.<sup>178</sup>

In sum, general CIL gets us only halfway toward an effective ASAT ban. There is, I submit, sufficient evidence of congruent behavior by the leading spacefaring States to satisfy the objective criterion; they have in general refrained from testing or using ASAT devices. The observed pattern of conformity is not perfect, but especially in the past two decades (and, specifically, until the U.S. and Chinese events in 2007 and 2008), the aberrations from a "no ASATs" rule have been few. If physical actions alone were sufficient to entrench a CIL rule, then we would have such a standard.

On the other hand, the evidence to satisfy the subjective component of the usual definition of CIL is essentially lacking. States have not generally asserted the belief that ASAT testing or use is already a violation of the world community's expectations. The three States that have occasionally conducted ASAT events have certainly not conceded the illegality of their respective programs, and the many other States that observe and comment on those ASAT programs have criticized them with rhetoric that sounds in policy, not in law. To date, there has

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177. *Japan's Abe Charges China Satellite Test Illegal*, SPACE DAILY, Jan. 31, 2007, available at [http://www.spacedaily.com/reports/Japan\\_Abe\\_Charges\\_China\\_Satellite\\_Test\\_Illegal\\_999.html](http://www.spacedaily.com/reports/Japan_Abe_Charges_China_Satellite_Test_Illegal_999.html) (last visited June 30, 2009).

178. Joshi, *supra* note 12, at 13, 15; Jangveer Singh, *China's Space Test Unethical: ISRO Chief*, TRIBUNE (New Delhi), Feb. 6, 2007, available at <http://www.tribuneindia.com/2007/20070206/main3.htm> (last visited June 30, 2009).



been little affirmative argumentation that an *opinio juris* already exists to outlaw ASATs under general CIL.<sup>179</sup>

## V. THE CUSTOMARY INTERNATIONAL LAW OF ARMED CONFLICT AND ASATs

Some skeptics may doubt the continued viability or even the sheer existence of a body of law purporting to regulate international armed conflict—no less an authority than former Attorney General Alberto Gonzales dismissively referred to some of its central precepts as “quaint” and “obsolete.”<sup>180</sup> Nonetheless, the Law of Armed Conflict (LOAC) assuredly exists; it imposes important restraints on what might otherwise be an excessively cruel and costly conduct of warfare, and States in general endeavor to comply with its terms.<sup>181</sup> LOAC

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179. An alternative legal analysis, beyond the scope of this Article, would ask whether China has incurred a different type of international legal obligation to refrain from further tests of its debris-creating kinetic energy ASAT system. That is, in response to the international outcry in opposition to the 2007 event, China affirmed that it had “no further plans for destructive ASAT tests.” See Moltz, *supra* note 65, at 203; Richard Weitz, *Chinese Anti-Satellite Weapon Test: The Shot Heard “Round the World”*, 13 WMD INSIGHTS 2 (2007).

In a somewhat similar circumstance, an official unilateral statement by the French government in 1974 that it did not intend to conduct further tests of nuclear weapons in the atmosphere in the South Pacific, after international complaint about prior explosions, was deemed by the ICJ to be a binding legal obligation which France could not thereafter unilaterally withdraw. *Nuclear Tests (Austl. v. Fr.)*, 1974 I.C.J. 253, 267–70 (Dec. 20); *Nuclear Tests (N.Z. v. Fr.)*, 1974 I.C.J. 457, 472–75 (Dec. 20); *see also* Legal Status of Eastern Greenland (*Den. v. Nor.*), 1933 P.C.I.J. (ser. A/B) No. 53, at 69–73 (Apr. 5) (construing the unilateral statement of the Norwegian foreign minister as a binding commitment abandoning national claims to a disputed island); Elizabeth Wilcox, Deputy Legal Advisor, U.S. Mission to the United Nations, U.S. Statement to the U.N. 6th Committee (ILC Report) Re: Unilateral Acts of States (Oct. 30, 2006), available at <http://www.state.gov/s/I/2006/98333.htm> (last visited June 30, 2009).

180. Memorandum from Alberto R. Gonzales to the President of the United States, Decision Re: Application of the Geneva Convention on Prisoners of War to the Conflict with Al Qaeda and the Taliban 2 (Jan. 25, 2002), available at [http://www.washingtonpost.com/wp-srv/politics/documents/cheney/gonzales\\_addington\\_memo\\_jan252001.pdf](http://www.washingtonpost.com/wp-srv/politics/documents/cheney/gonzales_addington_memo_jan252001.pdf) (last visited June 30, 2009).

181. David Graham, *Operational Law*, in NATIONAL SECURITY LAW, *supra* note 18, at 373. *See generally* Respect for Human Rights in Armed Conflicts, G.A. Res. 2444, U.N. GAOR, 23d Sess., Supp. No. 18, U.N. Doc. A/7218 (Dec. 19, 1968); JAMES E. BAKER, IN THE COMMON DEFENSE: NATIONAL SECURITY LAW FOR PERILOUS TIMES (2007); JUDITH GARDAM, NECESSITY, PROPORTIONALITY AND THE USE OF FORCE BY STATES (2004); MARY ELLEN O’CONNELL, INTERNATIONAL LAW AND THE USE OF FORCE (2d ed. 2009); PETRAS, *supra* note 20; A.P.V. ROGERS, LAW ON THE BATTLEFIELD (2d ed. 2004); James E. Baker, *When Lawyers Advise Presidents in Wartime*, 55 NAVAL WAR C. REV. 11 (2002); Jackson Maogoto & Steven Freeland, *The Final Frontier: The Laws of Armed Conflict and Space Warfare*, 23 CONN. J. INT’L L. 167 (2008); W. Hays Parks, *The Law of War*, in 2 ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT, *supra* note 21, at 1053; Ramey, *supra* note 7; Florencio J. Yuzon, *Deliberate Environmental Modification Through the Use of Chemical and Biological Weapons*:

seamlessly embraces both treaty law and customary law; for present purposes, we are concerned principally with the CIL measures, as these would be fully binding (as discussed above) even on countries that had resolutely refused to adhere to the relevant treaties.

Within the specialized realm of LOAC customary law, three crucial centuries-old precepts of interest to the ASAT saga stand out:

- Discrimination (or distinction): a military force may legitimately target only military objectives, and must not deliberately attack civilians or neutrals;
- Proportionality: a military force may not undertake an attack that would inflict excessive damage on non-combatants, when compared to the direct, concrete military advantage gained from the action; and
- Necessity: a military force is authorized to undertake only those attacks that are indispensable in securing the prompt submission of the enemy.

The following subsections consider each of these inter-related legal standards in detail and assess their applicability to ASAT operations. First, however, a limiting condition must be noted: LOAC applies, for the most part, only to the conduct of hostilities during time of conflict; these principles are therefore essentially irrelevant to the *testing* phase of a weapon's life cycle.

There is a separate mandate, requiring a country to assess the lawfulness of any weapon it might deploy, to ensure that it does not *per se* violate LOAC standards. The United States therefore routinely evaluates each new weapon program, early in its development phase, for conformity to treaty and CIL standards. One cannot lawfully deploy a weapon that cannot be lawfully used.<sup>182</sup> If the thesis of this Article proves correct, then at least some categories of ASAT weaponry should be screened out at this initial filter, even before testing occurs. But ill-advised, hazardous, or self-defeating weapons testing programs are generally not themselves illegal under this branch of CIL; LOAC rules are generally confined to the combat arena alone.<sup>183</sup>

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*"Greening" the International Laws of Armed Conflict to Establish an Environmentally Protective Regime*, 11 AM. U. J. INT'L L. & POL'Y 793 (1996).

182. Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 246 (July 8) ("[I]f the use of force itself in a given case is illegal—for whatever reason—the threat to use such force will likewise be illegal.").

183. The international law expression of the obligation to assess new weapons for compliance with LOAC standards is Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts art. 36, June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Additional Protocol I]. Although the United States has

### A. Discrimination

The first fundamental precept is that a military force must target only military persons, materiel, and locations; civilians and other non-belligerents cannot lawfully be made the direct and intentional focus of an attack, and neutral States<sup>184</sup> and their property<sup>185</sup> are similarly off-limits. LOAC does not prohibit all “collateral damage” harm to civilians—that would probably be an impossible goal in any realistic military engagement—but it is axiomatic that force may lawfully be directed only at military objectives. A weapon system that is inherently incapable of that degree of finesse (or one that is sufficiently directional, but is in fact wielded in an indiscriminate fashion) is illegal.<sup>186</sup>

This principle underpins much of the law’s hostility to chemical and biological weapons, among others. Typically, those armaments would be employed in a scattershot fashion, unleashed as a cloud that may drift uncontrollably with the wind, rather than being precisely confined to an enemy’s military apparatus.<sup>187</sup> If the user cannot control—or even reliably predict—where the effects of the weapon may be felt, it fails the LOAC standard.

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not joined this treaty, domestic U.S. law accomplishes a similar goal. *See* U.S. Dep’t of Def., Directive 5000.1: Operation of the Defense Acquisition System, § E1.1.15 (May 12, 2003); *see also* Isabelle Daoust et al., *New Wars, New Weapons? The Obligation of States to Assess the Legality of Means and Methods of Warfare*, 84 INT’L REV. RED CROSS 345 (2002).

184. A neutral country is generally immune from attack by belligerents as long as it refrains from aiding either side in the conflict. In accordance with general principles of neutrality, a State seeking to preserve its status as a neutral would probably have to ensure that even privately owned reconnaissance and other satellites operated by its nationals also refrain from providing militarily useful data to either belligerent. However, longstanding exceptions to the general rules of armed conflict do not require a neutral State to prevent a belligerent from making use of communications systems, such as telephone or telegraph equipment. This exception may well extend to satellite communications systems too, rendering them immune from attack even if they were used to the advantage of a belligerent. *See generally* ARMY FIELD MANUAL 27–10, *supra* note 116, ¶¶ 512–21; ROGERS, *supra* note 181, at 177; Michel Bourbonniere, *The Ambit of the Law of Neutrality and Space Security*, 2006 ISR. Y.B. HUM. RTS. 205; Waldrop, *supra* note 16, at 226–28; .

185. LOAC standards provide protection for “things” as well as for “people.” Civilian objects are ordinarily immune from attack unless they directly support enemy military operations. ICRC, *supra* note 111, at 34; *see also* ARMY FIELD MANUAL 27–10, *supra* note 116, ¶¶ 48–55; STEPHEN DYCUS, NATIONAL DEFENSE AND THE ENVIRONMENT 142 (1996) (“Just as attacks on noncombatants are usually forbidden, destruction of the environment that supports those noncombatants is also outlawed.”).

186. ICRC, *supra* note 111, at 3–8, 37–43, 244–50; Ramey, *supra* note 7, at 36–39; Michael N. Schmitt, *The Principle of Discrimination in 21st Century Warfare*, 2 YALE HUM. RTS. & DEV. L.J. 143 (1999).

187. Martin Calhoun, *Chemical and Biological Weapons*, FOREIGN POL’Y FOCUS, Dec. 1966, available at <http://www.fpiif.org/pdf/vol1/22ifbich.pdf> (last visited June 30, 2009); Schmitt, *supra* note 186, at 155 (“The core reason chemicals and biologicals are prohibited is that they are inherently indiscriminate . . .”).

An ASAT weapon might appear, in contrast, to be quite discriminating—it is aimed with exquisite precision at a specific enemy satellite, and even a whole fleet of ASATs would be steered by the most sophisticated guidance systems to pick off particular hostile spacecraft one by one.

However, the indirect, or “second-order,” effects of a weapon must also be considered in evaluating its discrimination ability,<sup>188</sup> and any kinetic energy ASAT system that generates a significant plume of long-lasting debris would be vulnerable under this analysis. Shards of the destroyed spacecraft, traveling at hypervelocities, could prove fatal to any unlucky satellites—civilian or military, from a belligerent State or a neutral—that happened to traverse the conflict zone for decades to come. Inflicting those subsidiary combat casualties—randomly distributed among orbiters from any country, and serving any range of civilian purposes, with the unavoidable carnage continuing for years after the immediate war was halted—manifestly fails the discrimination test. Even where the ASAT user precisely aims at a legitimate target, and even if only that specific satellite is intentionally hit, the immense, uncontrollable subsidiary effects—lingering far longer, spreading far wider, and inflicting far more extensive harm to non-belligerents than chemical or biological weapons ever have—would be illegal under the CIL of armed conflict.<sup>189</sup>

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188. Bourbonniere, *supra* note 20, at 13, 14 (noting that in dealing with space debris, an extended temporal dimension is appropriate for evaluating collateral damage); *see also* Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 382 (July 8) (Shahabuddeen, J., dissenting) (arguing that in evaluating the effects of nuclear weapons, it is not important to differentiate between by-products and secondary effects of the munitions); Emily Broad et al., Human Rights Watch, Cluster Munitions and the Proportionality Test: Memorandum to Delegates of the Convention on Conventional Weapons (Apr. 2008), *available at* [http://www.hrw.org/sites/default/files/related\\_material/arms0408web.pdf](http://www.hrw.org/sites/default/files/related_material/arms0408web.pdf) (last visited June 30, 2009) [hereinafter CONVENTIONAL WEAPONS MEMORANDUM] (arguing that a weapon's foreseeable after-effects, inflicting second-order injuries, must be taken into account in assessing its legality); ICRC, *supra* note 111, at 40 (discussing Rule 12(c), defining “indiscriminate attacks” as including those whose effects cannot be limited as required by international law); ICRC, *Explosive Remnants of War: An Examination of Legal Issues Raised in the ERW Discussion*, U.N. Doc. CCW/CGE/II/WP.8 (July 15, 2002), *available at* <http://www.mineaction.org/downloads/G0262896.pdf> (last visited June 30, 2009) (concluding that “post-conflict responsibility for dangerous munitions has been recognized by states”); Schmitt, *supra* note 186, at 168.

189. The discrimination requirement also highlights the difficulty posed by the increasing integration of military and civilian space assets. As noted in note 16, *supra*, and accompanying text, the United States and other spacefaring States have come to rely on dual-capable satellites to serve both quotidian civilian functions and military needs. This functional integration does not comport well with the cardinal LOAC requirement to separate military and civilian assets, because it excessively complicates the task of an attacker who attempts to comply with the requirements for discrimination. *See* Michel Bourbonniere & Ricky J. Lee, *Legality of the Deployment of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict*, 18 EUR. J. INT'L L. 873 (2007).

### B. Proportionality

A similar conclusion is driven by evaluation of the second fundamental LOAC touchstone, proportionality. When a military force anticipates (as it virtually always must) that a proposed attack would generate both positive, direct military value (in damaging or destroying enemy military assets or personnel) and undesired harm on civilians (and on neutrals and other non-belligerents) or their effects, then the attacker must pause to assess the comparative value of those two factors. Admittedly, this calculation is inherently opaque and inexact, as it requires weighing starkly incommensurable variables, but LOAC requires the attacker to consider whether, with all things considered, the strike is "worth it."<sup>190</sup>

Long-term, as well as immediate, effects must be considered, and the attacker is obligated to attempt to gather the data necessary for making an informed, mature judgment, including assessing the possible harms inflicted on nationals of neutral countries, and even on the natural environment.<sup>191</sup> If the anticipated collateral damage is excessive—if the reasonably expected hardship to protected sites is greater than the benefits that the operation can accomplish—then the attack must be modified or aborted.<sup>192</sup>

Again, an ASAT operation—especially one that might spawn a persistent debris hazard—is vulnerable under this analysis. The proportionality calculus could be exceptionally complicated because the military value of a particular ASAT operation could be high. If the enemy force is heavily reliant on its satellites for reconnaissance, communications, targeting, etc., and if it possesses few alternative "fall-

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190. CONVENTIONAL WEAPONS MEMORANDUM, *supra* note 188 (stressing the need to include "aftereffects"—i.e., the foreseeable long-term consequences of a weapon's use—in calculating proportionality, and noting that there is no time limit for assessing incidental damage); ICRC, *supra* note 111, at 46–50; Paul B. Larsen, *Application of the Precautionary Principle to the Moon*, 71 J. AIR L. & COM. 295 (2006); Ramey, *supra* note 7, at 39–40 (judging that the difficulty in applying the proportionality criterion makes that subjective judgment "the Achilles heel of the law of war"); Schmitt, *supra* note 186, at 150–52.

191. See generally CONVENTIONAL WEAPONS MEMORANDUM, *supra* note 188.

192. Glen Plant, *Introduction to ENVIRONMENTAL PROTECTION AND THE LAW OF WAR: A 'FIFTH GENEVA' CONVENTION ON THE PROTECTION OF THE ENVIRONMENT IN TIME OF ARMED CONFLICT* 3, 17 (Glen Plant ed., 1992) [hereinafter ENVIRONMENTAL PROTECTION AND THE LAW OF WAR] (surveying common law of armed conflict principles that apply to the environment); Schmitt, *supra* note 186, at 151 (noting the "growing recognition of the need to protect the environment during armed conflict"); see also *Legality of Threat or Use of Nuclear Weapons*, Advisory Opinion, 1996 I.C.J. 226, 243 (July 8) (concluding that nuclear weapons are contrary to international law because of their "destructive power . . . [which] cannot be contained in either space or time," and their "potential to destroy all civilization and the entire ecosystem of the planet").

back” substitutes, then destruction of one (or a few) orbiters could carry a significant premium.<sup>193</sup>

On the other hand, the “collateral damage” side of the proportional-ity balance could be weighty, too. If the would-be target satellite is ensconced in a popular orbit (exploited by many other satellites from other countries), especially if it is relatively high in space, then the fore-seeable debris field could be disruptive to the peaceful space activities of many users over an extended period. Depending on how many and what size debris fragments the attack might generate, how far they would be likely to spread, and how reliably they could be tracked (and possibly avoided) by subsequent space travelers, the costs of the ASAT operation could be substantial. Those costs would be borne by civilians, by space programs of other countries, and even by the subsequent satellites of the attacker itself, for many years after the conflict had terminated.<sup>194</sup>

Even a non-debris-generating ASAT, such as one employing a laser or other directed energy system, could impose significant costs on civil-ians and neutrals. If the target was a dual-use satellite—and it is increasingly common for orbiters to serve military and non-military cli-ents interchangeably<sup>195</sup>—then any interruption in its availability would negatively impact non-belligerents.

With all those variables, it may not be possible to assert confidently that no ASAT activity could ever be justified as acceptably proportionate under the traditional LOAC analysis. But it seems clear that *many* possi-ble ASAT operations would be ruled out, and even that *most* contemplated kinetic ASAT strikes would be of dubious legality. In any event, the attacker is required to *evaluate* proportionality: to gather the relevant available data about long-term costs and benefits necessary to making an intelligent decision.

### C. Necessity

Finally, the principle of necessity mandates that a military force is allowed to exercise only those operations that are not otherwise prohib-ited by international law and are indispensable in securing the prompt submission of the enemy. A method of warfare that is merely “nice to

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193. Petras, *supra* note 20, at 207–09; Noah Shachtman, *How China Loses the Coming Space War*, WIRED, Jan. 10, 2008, available at <http://blog.wired.com/defense/2008/01/inside-the-chin.html> (last visited June 30, 2009).

194. See Bourbonniere, *supra* note 184, at 205, 225 (arguing that the creation of space debris, and its effects on the rights of neutral States, must be important variables in assessing proportionality).

Even if the opponent violates its LOAC obligations by failing to separate its military and civilian assets, the attacker must still undertake a proportionality judgment and endeavor to protect civilians from the effects of the combat. ICRC, *supra* note 111, at 46–76.

195. See *supra* note 16 and accompanying text.

have,” or a military operation that might be able to make a small contribution, would not pass this test.<sup>196</sup>

In the ASAT context, if a country possessed both a kinetic energy ASAT system and a directed energy counterpart, and if both devices could suffice to perform a particular mission with equal success, then the “necessity” standard should help dictate the choice between them. Specifically, if a laser ASAT is available, and is equally effective, then employment of the interceptor technology, and the concomitant creation of hazardous space debris, is no longer “necessary.” Where a State can effectively neutralize an enemy’s satellite via mechanisms that do not impose the persistent debris harm to the peaceful space activities of future generations of civilians and neutral States, the LOAC customary standards would outlaw use of an interceptor.<sup>197</sup>

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196. Judith Gardam, *Necessity and Proportionality in Jus ad Bellum and Jus in Bello*, in INTERNATIONAL LAW, THE INTERNATIONAL COURT OF JUSTICE AND NUCLEAR WEAPONS, *supra* note 111, at 275; Ramey, *supra* note 7, at 35–40. Among the earliest assertions of the principle of necessity was the 1868 St. Petersburg Declaration Renouncing the Use in Time of War of Explosive Projectiles Under 400 Grammes Weight, Dec. 11, 1868, 138 Consol. T.S. 297, available at <http://www.icrc.org/ihl.nsf/FULL/130?OpenDocument> (last visited June 30, 2009), which asserted that there are “technical limits at which the necessities of war ought to yield to the requirements of humanity” and that “the only legitimate object which States should endeavor to accomplish during war is to weaken the military force of the enemy.” To a similar effect is the “Martens Clause,” included in varying forms in numerous treaties on the law of armed conflict, asserting that even when particular treaty restrictions are inapplicable, “civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.” Additional Protocol I, *supra* note 183, art. 1(2); ARMY FIELD MANUAL 27–10, *supra* note 116, ¶ 6; Michel Bourbonniere, *Legal Regime for Keeping Outer Space Free of Armaments: Prospects?*, 27 ANNALS AIR & SPACE L. 109, 126 (2002); Richard Falk, *The Environmental Law of War: An Introduction*, in ENVIRONMENTAL PROTECTION AND THE LAW OF WAR, *supra* note 192, at 78; Adam Roberts, *The Law of War and Environmental Damage*, in THE ENVIRONMENTAL CONSEQUENCES OF WAR: LEGAL, ECONOMIC, AND SCIENTIFIC PERSPECTIVES 47 (Jay E. Austin & Carl E. Bruch eds., 2000) [hereinafter THE ENVIRONMENTAL CONSEQUENCES OF WAR]; Ramey, *supra* note 7, at 127–29.

In the famous 1837 *Caroline* case, U.S. Secretary of State Daniel Webster articulated the law regarding necessity, in language that has now been generally accepted. He argued that military action is acceptable only on a showing of “necessity of self-defense, instant, overwhelming, leaving no choice of means, and no moment for deliberation. It will be for it to show, also, that the local authorities . . . did nothing unreasonable or excessive; since the act justified by the necessity of self-defence, must be limited by that necessity, and kept clearly within it.” Letter from Daniel Webster, U.S. Sec’y of State, to Lord Ashburton (Apr. 24, 1841), available at [http://avalon.law.yale.edu/19th\\_century/br-1842d.asp](http://avalon.law.yale.edu/19th_century/br-1842d.asp) (last visited July 29, 2009); see also Louis-Philippe Rouillard, *The Caroline Case: Anticipatory Self-Defence in Contemporary International Law*, 1 MISKOLC J. INT’L L. 104 (2004).

197. For comparison, some have already argued that the availability of very accurate “smart bombs,” which can reduce collateral damage to civilians via great accuracy in the placement of the ordnance, should replace older, less accurate munitions. Indeed, preferential use of the new technology may now be mandatory, since reliance on traditional “dumb” bombs is no longer “necessary,” and the unintended harm to protected persons and places could now be avoided. See Stuart W. Belt, *Missile Over Kosovo: Emergence, Lex Lata, of a*

In sum, the *lex specialis* of armed conflict already throws a sinew of law around the prospect of ASAT operations. Discrimination, proportionality, and necessity all militate against the exploitation of debris-creating kinetic energy interceptors. Even where the contemplated ASAT operation would fulfill a valid military purpose, it might nonetheless be illegal on the grounds that it inflicted excessive, uncontrollable, and largely unpredictable harm to the future space activities of civilians and of nationals of States that were not engaged in the current fighting.

The LOAC principles apply, as noted, only to the *use* in combat, and they bite only at the forms of ASAT weapons that would generate debris. But it is remarkable that the CIL on these points already exists, that it requires no further endorsement in the form of treaty enactments, and that its extension to the novel arena of outer space is relatively straightforward, if largely unnoticed.

## VI. CUSTOMARY INTERNATIONAL ENVIRONMENTAL LAW AND ASATS

We turn next to a much younger<sup>198</sup> area of specialized CIL, one that may also extend restrictions on ASAT operations in surprising ways. International environmental law attempts to rein in national behaviors that pollute, damage, or jeopardize the natural environment in significant measure, even when no particular State is individually aggrieved. As with LOAC, skeptics may doubt the efficacy or even the existence of international environmental law, but, again as with LOAC, the reality is now abundantly clear: hundreds of treaties, UNGA resolutions, and declarations of other noteworthy international bodies attest to the ambition, competence, and accomplishment of the international environmental movement.<sup>199</sup>

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*Customary Norm Requiring the Use of Precision Munitions in Urban Areas*, 47 NAVAL L. REV. 115 (2000); Danielle L. Infeld, *Precision-Guided Munitions Demonstrated Their Pinpoint Accuracy in Desert Storm; But Is a Country Obligated to Use Precision Technology to Minimize Collateral Civilian Injury and Damage?*, 26 GEO. WASH. J. INT'L L. & ECON. 109 (1992); Christopher B. Puckett, *In This Era of "Smart Weapons," Is a State Under an International Legal Obligation to Use Precision-Guided Technology in Armed Conflict?*, 18 EMORY INT'L L. REV. 645 (2004).

198. But see Carl E. Bruch, *Introduction* to THE ENVIRONMENTAL CONSEQUENCES OF WAR, *supra* note 196, at 13 (quoting *Deuteronomy* 20:19–20 as establishing a Biblical legal norm about environmental protection during armed conflict, when saying “[w]hen you are at war, and lay siege to a city for a long time in order to take it, do not destroy its trees by taking the axe to them . . .”).

199. See generally LAKSHMAN D. GURUSWAMY ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND WORLD ORDER 75–105 (1994); DAVID HUNTER ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY (3rd ed. 2007); ALEXANDRE KISS & DINAH SHELTON, INTERNATIONAL ENVIRONMENTAL LAW 105–07 (1991) (arguing that “it is possible to discern



A prominent early example of this emergent international environmental law is the pathbreaking 1972 Stockholm Declaration, crafted at the U.N. Conference on the Human Environment, through which all leading States confirmed that protection of the environment is a major issue affecting everyone's well-being and "is the urgent desire of the peoples of the whole world and the duty of all Governments."<sup>200</sup> Principle 21 of the Declaration affirms that States have "the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."<sup>201</sup> Identical language was featured two decades later in the 1992 Rio Declaration on Environment and Development, in its Principle 2.<sup>202</sup>

The UNGA has repeatedly confirmed and elaborated those assertions, urging all governments to pursue and effectuate the Stockholm and

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among current norms [of customary international environmental law] 'evidence of a general practice, accepted as law,' even though only a short period of time has elapsed"); Edith Brown Weiss, *International Environmental Law: Contemporary Issues and the Emergence of a New World Order*, 81 GEO. L.J. 675 (1993) (noting nearly 900 treaties concerned with international environmental law).

Regarding the intersection between environmental law and the law of armed conflict, see generally DYCUS, *supra* note 185; THE ENVIRONMENTAL CONSEQUENCES OF WAR, *supra* note 196; U.S. NAVAL WAR COLLEGE, PROTECTION OF THE ENVIRONMENT DURING ARMED CONFLICT (Richard J. Grunawalt at al. eds., 1996); EDITH BROWN WEISS ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 723-55 (2d ed. 2006); Aoki, *supra* note 168, at 47 (considering international environmental law and the 2007 Chinese ASAT test); Plant, *supra* note 192; Bernard K. Schafer, *The Relationship Between the International Laws of Armed Conflict and Environmental Protection: The Need to Reevaluate What Types of Conduct Are Permissible During Hostilities*, 19 CAL. W. INT'L L.J. 287 (1989); Michael N. Schmitt, *Green War: An Assessment of the Environmental Law of International Armed Conflict*, 22 YALE J. INT'L L. 1 (1997); Edith Brown Weiss, *Opening the Door to the Environment and to Future Generations*, in INTERNATIONAL LAW, THE INTERNATIONAL COURT OF JUSTICE AND NUCLEAR WEAPONS, *supra* note 111, at 338; Marco Roscini, *Protection of the Natural Environment in Time of Armed Conflict*, Univ. of Westminster School of Law, Research Paper No. 09-07 (2008), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1351888](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1351888) (last visited July 29, 2009).

200. U.N. Conference on the Human Environment, June 5-16, 1972, *Stockholm Declaration*, pmbl., ¶ 2, U.N. Doc. A/CONF.48/14 (June 16, 1972).

201. *Id.* princ. 21.

202. U.N. Conference on Environment and Development, June 3-14, 1992, *Rio Declaration on Environment and Development*, princ. 2, U.N. Doc. A/CONF.151/5/Rev. 1 (June 13, 1992); see also *id.* princ. 13 ("States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for the adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction."); *id.* princ. 24 ("Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.").

Rio pronouncements,<sup>203</sup> emphasizing the special responsibility to protect the environment in times of armed conflict,<sup>204</sup> and stressing that all States should “ensure that activities within their jurisdiction or control do not cause damage to the natural systems located within other States or in the areas beyond the limits of national jurisdiction.”<sup>205</sup> The UNGA has also flatly asserted that “destruction of the environment, not justified by military necessity and carried out wantonly, is clearly contrary to existing international law.”<sup>206</sup>

International agreements bespeak a set of similar commitments. The 1993 Convention on Biological Diversity echoes the States’ responsibility “to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”<sup>207</sup> The U.N. Framework Convention on Climate Change carries forward parallel language, noting that the statement is “in accordance with the Charter of the United Nations and the principles of international law.”<sup>208</sup>

The Restatement confirms that the core of the Stockholm and Rio propositions has advanced far beyond the status of mere aspiration, and has achieved the widespread, longstanding acceptance, pursuant to a sense of legal obligation, to have risen to the status of binding CIL. Section 601 asserts state obligations with respect to the common environment:

A state is obligated to take such measures as may be necessary, to the extent practicable under the circumstances, to ensure that activities within its jurisdiction or control . . . are conducted so

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203. Report of the United Nations Conference on the Environment, G.A. Res. 47/190, U.N. Doc. A/RES/47/190 (Mar. 16, 1993) (endorsing the Rio Declaration and urging governments “to take the necessary action to give effective follow-up” to it).

204. Protection of the Environment in Times of Armed Conflict, G.A. Res. 47/37, U.N. Doc. A/RES/47/37 (Feb. 9, 1993) (urging States “to take all measures to ensure compliance with the existing international law applicable to the protection of the environment in times of armed conflict”).

205. World Charter for Nature, G.A. Res. 37/7, ¶ 21(d), U.N. Doc. A/RES/37/7 (Oct. 28, 1982).

206. G.A. Res. 47/37, *supra* note 204, ¶ 5.

207. U.N. Conference on Environment and Development, Convention on Biological Diversity art. 3, June 5, 1992, 31 I.L.M. 818; *see* WEISS ET AL., *supra* note 199, at 283 (noting the incorporation of Principle 21 in numerous international environmental law treaties and other documents).

208. U.N. Conference on Environment and Development, Framework Convention on Climate Change, pmbl., ¶ 8, June 3–14, 1992, U.N. Doc. A/AC.237/18 (May 9, 1992), 31 I.L.M. 851.

as not to cause significant injury to the environment of another state or of areas beyond the limits of national jurisdiction.<sup>209</sup>

The ICJ, too, has had the occasion to recognize the binding quality of this feature of customary international environmental law. In the 1996 Nuclear Weapons Advisory Opinion, the court affirmed that “[t]he existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.”<sup>210</sup> A year later, the ICJ repeated that conclusion in the *Case Concerning the Gabčíkovo-Nagymaros Project (Hungary vs. Slovakia)*.<sup>211</sup>

A few vocabulary points about the language of these documents must be noted. First, in these instruments, the reference to “areas beyond the limits of national jurisdiction” was principally intended to refer to the high seas, Antarctica, and other sectors of the terrestrial “global commons” that no country could or did claim as part of its sovereign territory. But the concept certainly embraces outer space as well, particularly given the OST’s explicit stricture that no country may subject space, the moon, or other celestial bodies to claims of national sovereignty.<sup>212</sup>

Second, the language of these prescient instruments contemplates not just “pollution” as ordinarily understood, but more generic “damage” or “injury” to the environment, which would surely include activities that degrade or despoil outer space by so littering it with hazardous, long-lasting ASAT debris that vast regions are rendered unfit for transit or use. In fact, the near-permanent character of high-altitude space debris far eclipses what would ordinarily be contemplated as serious harm to the oceans or Antarctica, such as via unregulated runoff, tanker collisions, or even dumping of hazardous materials. In the same vein, where documents refer to “significant” injury to the international environment,

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209. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 601(1) (1987).

210. Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 241–42 (July 8); see also HUNTER ET AL., *supra* note 199, at 502–07 (discussing the fundamental CIL obligation not to cause environmental harm).

211. Gabčíkovo-Nagymaros Project (Hung. v. Slov.) 1997 I.C.J. 7, 41 (Sept. 25).

212. Outer Space Treaty, *supra* note 1, art. II; see also RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES pp. 99 (1987) (referring to “‘global commons,’ i.e., areas over which no state has jurisdiction or control but which are of common interest to all states—outer space, Antarctica, ice floes, and unoccupied islands”); Michael A. Meyer, *A Definition of the ‘Environment’*, in ENVIRONMENTAL PROTECTION AND THE LAW OF WAR, *supra* note 192, at 255; David Tolbert, *Defining the ‘Environment’*, in ENVIRONMENTAL PROTECTION AND THE LAW OF WAR, *supra* note 192, at 257 (offering expansive definitions of “environment”).

that threshold would, unhappily, be easily met by the sorts of ASAT-generated space debris under consideration here. This is not a case of merely *de minimis* harms.<sup>213</sup>

Next, the rhetoric makes clear that this sort of injury to the global commons is an issue of universal concern, properly raised even by States that are not individually damaged by the offending acts, and even by States that currently do not undertake or even contemplate space activities that would exploit the resources—everyone has a legitimate, permanent interest in the preservation of that delicate environment.<sup>214</sup>

Finally, to address a point that has surfaced in virulent form in a very different context, these documents speak of activities undertaken “within the jurisdiction and control” of a State. The “action” in contemplation here—the exoatmospheric collision or detonation of a killer satellite—unquestionably occurs outside any State’s territory. But the clear import of the law would have to reach the “action” that drove that destruction, that is, a government’s decision to test or use its ASAT in a debris-creating mode, and that decision-making action would ordinarily be undertaken in the national capital, certainly within its jurisdiction and control.<sup>215</sup>

These crucial environmental protection norms would certainly apply to a State’s ASAT testing activities during peacetime (thereby neatly complementing the LOAC rules identified in Part V, which by their terms apply only during wartime). But to what extent are environmental

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213. See RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 601, reporters’ note 2 (1987) (quoting the definition of “pollution” from the Organisation for Economic Co-operation and Development as “any introduction by man, directly or indirectly, of substance or energy into the environment resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems, impair amenities or interfere with other legitimate uses of the environment”); see also Vereshchetin, *supra* note 57, ¶ 21 (describing human-caused debris as “a new kind of pollution of outer space”).

214. Much of the early writing and litigation on international environmental law concentrated on situations in which the pollution or other environmental damage caused by one country was inflicted on a specific other country (usually a neighboring State downwind or downstream). See, e.g., Trail Smelter Case (U.S. v. Can.), 3 R. Int’l Arb. Awards 1905 (Panel of Robert A.E. Greenshields, Jan Frans Hostie, & Charles Warren 1941). More recently, harm to the “global commons” has been considered actionable, even without identification of a particular complaining country that is specially afflicted.

215. Cf. *Boumediene v. Bush*, 128 S.Ct. 2229 (2008) (ruling that the constitutional right of habeas corpus applies to detainees in the U.S. military base at Guantanamo Bay, even though Cuba retains sovereignty over the area, since United States exercises *de facto* control); see also *Env’tl. Def. Fund v. Massey*, 986 F.2d 528 (D.C. Cir. 1993) (requiring application of National Environmental Policy Act (NEPA) environmental evaluation procedures to federal activities in Antarctica, because the decisions regarding construction activities would be undertaken in Washington, D.C., even though the effects would be felt in an area outside national jurisdiction); HUNTER ET AL., *supra* note 199, at 1523 (suggesting that the *Massey* decision was driven by the unique jurisdictional status of Antarctica—a region devoid of national sovereignty, where the United States exercises considerable control (much like outer space)).

protection standards also effective during combat, to help regulate ASAT uses?<sup>216</sup>

There is often substantial uncertainty regarding the applicability of ordinary international law during wartime; both treaties and CIL rules have to be parsed with care to determine whether the parties may have intended to suspend or terminate the obligations when conflict arises. Much of environmental law, in particular, is probably designed to be applicable only during peacetime; obviously, combat can be thoroughly devastating for the environment, and many standard rules of protection would be simply held in abeyance until the fighting subsides.<sup>217</sup>

But some CIL rules are deliberately designed to be applicable even (or especially) during hostilities, and these postulates provide something of a bridge between Part V and Part VI of this Article. Unfortunately, this area of law is one characterized by persistent absence of consensus, especially regarding the position of the United States, and it is difficult to state with certainty the content of any CIL rules on States' obligations regarding environmental protection during combat.<sup>218</sup>

The International Committee of the Red Cross (ICRC) asserts, in its authoritative tome on Customary International Humanitarian Law, several propositions that would explicitly incorporate environmental concerns into the traditional LOAC standards of discrimination, proportionality, and necessity. For example:

Rule 43: The general principles on the conduct of hostilities apply to the natural environment:

A. No part of the natural environment may be attacked, unless it is a military objective.

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216. In *Corfu Channel (U.K. v. Alb.)*, 1949 I.C.J. 4, 22 (Apr. 9), the ICJ ruled that Albania's obligation to notify passing ships about the hazards of mines placed in an international waterway arose not simply from LOAC treaty law (which would be applicable only during wartime) but even more from "general and well-recognized principles" and "elementary considerations of humanity," which are "even more exacting in peace than in war." *Id.*

217. RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 336, cmt. e, reporters' note 4 (1987) (stating that the law regarding application of treaties during wartime is now "uncertain"); WEISS ET AL., *supra* note 199, at 344–49, 747–49; Roberts, *supra* note 196; Christopher D. Stone, *The Environment in Wartime: An Overview*, in *THE ENVIRONMENTAL CONSEQUENCES OF WAR*, *supra* note 196, at 16, 24; Silja Voneky, *Peacetime Environmental Law as a Basis of State Responsibility for Environmental Damage Caused by War*, in *THE ENVIRONMENTAL CONSEQUENCES OF WAR*, *supra* note 196, at 190, 193, 197; Roscini, *supra* note 199, at 24–28; United States Statement to the International Law Commission Concerning the Effect of Armed Conflict on Treaties, Nov. 29, 2005, available at <http://www.state.gov/s/l/2005/87206.htm> (last visited July 29, 2009).

218. See Gabrynowicz, *supra* note 146, at 115–16 (arguing that it is now "crystal clear" that the Outer Space Treaty remains in force during conflict).

B. Destruction of any part of the natural environment is prohibited, unless required by imperative military necessity.

C. Launching an attack against a military objective which may be expected to cause incidental damage to the environment which would be excessive in relation to the concrete and direct military advantage anticipated is prohibited.

Rule 44: Methods and means of warfare must be employed with due regard to the protection and preservation of the natural environment. In the conduct of military operations, all feasible precautions must be taken to avoid, and in any event to minimise, incidental damage to the environment. Lack of scientific certainty as to the effects on the environment of certain military operations does not absolve a party to the conflict from taking such precautions.

Rule 45: The use of methods or means of warfare that are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment is prohibited. Destruction of the natural environment may not be used as a weapon.<sup>219</sup>

If these postulates genuinely constitute universal CIL, they would impose on military forces a duty of care in any wartime ASAT operations that would be entirely consistent with their more general LOAC obligations. Specifically, a State contemplating an ASAT attack would be enjoined:

- to attack only legitimate military objectives (and the natural environment—including outer space—does not count as a military objective);
- to calculate the proportionality assessment weighing unintended damage to civilian and neutral persons and assets versus the military value expected from the attack (and harm to the natural environment—including outer space—must be factored into the mathematics); and
- to undertake only those strikes that are militarily necessary.

In most respects, these specific obligations dovetail with those described in Part V, and the United States generally accepts these postulates of the international environmental law of armed conflict. In

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219. ICRC, *supra* note 111, at 143–58; *see also* United Nations Decade of International Law, G.A. Res. 49/50, GAOR, 49th Sess., 84th plen. mtg., U.N. Doc. A/RES/49/50 (Feb. 17, 1995) (inviting States to consider adopting the guidelines and instructions drafted by the ICRC for protection of the environment in times of armed conflict).

some specific areas, however, the United States has taken a different view, rejecting the ICRC's contention that CIL has already fully evolved on these points.<sup>220</sup> The most salient illustration of the difference concerns the ICRC's contention that CIL categorically bars any warfighting action that would inflict "widespread, long-term and severe damage to the natural environment." In contrast, the United States asserts that even such catastrophic actions might be justifiable as "proportionate" if sufficient military gain could be garnered thereby. The United States views the ICRC Rule 45 obligations as being grounded exclusively in treaty law, not CIL, and the relevant treaty (the 1977 Additional Protocol I to the 1949 Geneva Conventions) is an instrument that the United States has not joined, and is therefore not bound to implement.<sup>221</sup>

There may be a soupçon of difference between the ICRC view and the U.S. view, but both would provide substantial protection to the international environment as such, as well as to transiting satellites, and both would affirm that harm to outer space itself must be taken into account in assessing the discrimination, proportionality and necessity of an attack.<sup>222</sup> As a practical matter, the separation between the two perspectives

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220. ICRC, *supra* note 111, at 151; Bellinger & Haynes, *supra* note 117, at 6; *see also* Emanuelli, *supra* note 117 (critiquing ICRC methodology in assessing CIL).

221. Additional Protocol I, *supra* note 183, art. 35(3) ("It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment."); *id.* art. 55 ("Care shall be taken in warfare to protect the natural environment against wide-spread, long-term and severe damage.").

Regarding American views on Additional Protocol I, *see* Bellinger & Haynes, *supra* note 117; Roberts, *supra* note 196, at 68–71; Michael N. Schmitt, *War and the Environment: Fault Lines in the Prescriptive Landscape*, in *THE ENVIRONMENTAL CONSEQUENCES OF WAR*, *supra* note 196, at 87.

Regarding the status of Protocol I as CIL, *see* Harry Almond, Jr., *Weapons, War and the Environment*, 3 GEO. INT'L ENVTL. L. REV. 117 (1990) (arguing that the "practice of states during hostilities shows a relatively limited tolerance with regard to protecting the environment, and a wide degree of freedom in resorting to violence," and noting that even the language of the 1977 Protocols is ambiguous and hortatory); Bourbonniere, *supra* note 189, at 128–32; Yuzon, *supra* note 181, at 823 (stating that Protocol I "has not risen to the level of general acceptance by states needed to constitute a customary principle").

Another arms control treaty might at first blush appear relevant to ASAT testing and use in this context. The 1977 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, May 18, 1977, 1108 U.N.T.S. 151, 31 U.S.T.S. 333, commits its parties not to engage in environmental modification techniques that have widespread, long-lasting, or severe effects. This treaty, however, applies only to warmaking activities that *manipulate* the natural processes of the environment for hostile purposes (such as by triggering earthquakes or monsoons), not to those that *damage* the environment.

222. *See* Susana Pimiento Chamorro & Edward Hammond, *Addressing Environmental Modification in Post-Cold War Conflict: The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD) and Related Agreements* (Edmonds Inst. Occasional Paper, 2001), available at <http://www.edmonds-institute.org/pimiento.html> (last visited June 30, 2009) (arguing for a less anthropocentric approach, protecting the environment *per se*, independent of its value for human beings).

is small for our purposes; via either route, CIL standards inveigh against debris-creating ASATs, during either wartime or peacetime.<sup>223</sup> As the ICJ stated in the *Nuclear Weapons Advisory Opinion*:

The Court does not consider that the [environmental protection] treaties in question could have intended to deprive a State of the exercise of its right of self-defense under international law because of its obligations to protect the environment. Nonetheless, States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality.<sup>224</sup>

## VII. THE PRECEDENT: THE CUSTOMARY INTERNATIONAL LAW OF CHEMICAL WEAPONS

Could this really happen? Could evolving customary international law “sneak up” on the world community in this way, effectively emplacing meaningful constraints on the testing and use of a particular weapon, with nobody quite realizing that it was occurring?

Sheer precedent provides one important reason for taking the possibility seriously: this inchoate CIL law-making process has operated previously in much the same way elsewhere within the national security sector. Chemical weapons—an even more problematic issue for the world community, dispersed over a far longer time period to many more countries and used with alarming frequency in international and internal combat—were rendered illegal under invisibly evolving CIL, long before any treaty codified the world’s revulsion with that form of belligerency.<sup>225</sup>

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223. INT’L & OPERATIONAL LAW DEP’T, U.S. ARMY, OPERATIONAL LAW HANDBOOK 386 (2008).

224. Legality of Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 242 (July 8); see also Bourbonniere, *supra* note 20; Arjen Vermeer, *A Legal Exploration of Force Application in Outer Space*, 46 MIL. L. & L. WAR REV. 299, 324 (2007).

225. See Susan Benesch et al., *International Customary Law and Antipersonnel Landmines: Emergence of a New Customary Norm*, LANDMINE MONITOR, May 1999, [http://www.icbl.org/lm/1999/appendices/custom\\_law.html](http://www.icbl.org/lm/1999/appendices/custom_law.html) (arguing that CIL already forbids use of anti-personnel land mines, independent of treaty commitments); Karen Parker, *The Illegality of DU Weaponry*, Working Paper Prepared for the International Uranium Weapons Conference in Hamburg, Germany (Oct. 16–19, 2003), available at [http://www.uraniumweaponsconference.de/speakers/parker\\_illegality.pdf](http://www.uraniumweaponsconference.de/speakers/parker_illegality.pdf) (last visited July 19, 2009) (arguing that customary LOAC principles already render depleted uranium weapons illegal); see also Karen Hulme, *Of Questionable Legality: The Military Use of Cluster Bombs in Iraq*



### A. A Brief History of Chemical Weapons

Chemical weapons have been researched, developed, tested, manufactured, deployed, used, and retired by many countries in diverse settings throughout the ages. Occasional CW applications (or myths) predate the biblical era, and as technology opened new, more lethal doors, the military forces of many States rushed through. The insidious carnage reached its zenith during World War I, when mustard gas, phosgene, chlorine and a hoard of other noxious agents killed 100,000 and injured one million more.<sup>226</sup>

At the same time, public opinion has always recoiled against chemical warfare, seeing it as a particularly loathsome form of combat, and international diplomatic efforts have responded (slowly and fragmentarily) to that perspective, attempting to craft meaningful legal impediments against CW. Some of the earliest arms control treaties—the Brussels Declaration of 1874<sup>227</sup> and the Hague Conventions of 1899<sup>228</sup> and 1907,<sup>229</sup> for example—were crafted with this horrific invisible weapon clearly in mind.<sup>230</sup>

By 1925, the Geneva Protocol achieved a major milestone, with the parties declaring that “the use in war of asphyxiating, poisonous or other gases . . . has been justly condemned by the general opinion of the civi-

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in 2003, 2004 CAN. Y.B. INT’L L. 143 (suggesting that CIL may already outlaw cluster munitions).

226. Regarding chemical weapons (CW) and arms control, see generally Charles C. Flowerree, *Chemical and Biological Weapons and Arms Control*, in 2 *ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT* *supra* note 21, at 999; Timothy L.H. McCormack, *International Law and the Use of Chemical Weapons in the Gulf War*, 21 CAL. W. INT’L L.J. 1 (1991); John Ellis van Courtland Moon, *Controlling Chemical and Biological Weapons Through World War II*, in 2 *ENCYCLOPEDIA OF ARMS CONTROL AND DISARMAMENT* *supra* note 21, at 657; Julian Perry Robinson, *Chemical and Biological Weapons*, in *COMBATING WEAPONS OF MASS DESTRUCTION: THE FUTURE OF INTERNATIONAL NONPROLIFERATION POLICY* 74 (Nathan E. Busch & Daniel H. Joyner eds., 2009); Jean Pascal Zanders, *International Norms Against Chemical and Biological Warfare: An Ambiguous Legacy*, 8 J. CONFLICT & SECURITY L. 391 (2003); *see also* Bruce Bower, *Early Chemical Warfare Comes to Light*, SCIENCE NEWS, Jan. 11, 2009, available at [http://www.sciencenews.org/view/generic/id/39814/title/Ancient\\_chemical\\_warfare\\_comes\\_to\\_light](http://www.sciencenews.org/view/generic/id/39814/title/Ancient_chemical_warfare_comes_to_light) (last visited July 29, 2009) (reporting evidence of chemical warfare by Sasanians against Romans in what is now Syria in 256 AD).

227. Project of an International Declaration Concerning the Laws and Customs of War, Aug. 27, 1874, art. 13(a) (not in force), available at <http://www.icrc.org/ihl.nsf/FULL/135?OpenDocument> (last visited July 29, 2009).

228. Declaration on the Use of Projectiles the Object of Which Is the Diffusion of Asphyxiating or Deleterious Gases, July 29, 1899, Jul. 29, 1899, 32 Stat. 1803.

229. Regulations Respecting the Laws and Customs of War on Land, Hague Convention Respecting the Laws and Customs of War on Land art. 23(a), Oct. 18, 1907, 36 Stat. 2277, 1 Bevans 631 (“[I]t is especially forbidden to employ poison or poisoned weapons.”).

230. *See* U.S. ARMS CONTROL & DISARMAMENT AGENCY, *ARMS CONTROL AND DISARMAMENT AGREEMENTS: TEXTS AND HISTORIES OF THE NEGOTIATIONS* 5 (1996) (noting that after World War I, prohibitions against CW were also built into the Versailles Treaty and into the peace treaties with the defeated Austria, Bulgaria, and Hungary).

lized world; and . . . to the end that this prohibition shall be universally accepted as a part of International Law, binding alike the conscience and the practice of nations . . . .”<sup>231</sup> The Geneva Protocol prohibited the use of what we now classify as both chemical and biological weapons, but its archaic terms (and a raft of reservations, through which many countries limited the application of the treaty) converted it essentially into a ban on the *first* use of those armaments.<sup>232</sup>

During the remainder of the twentieth century, those two trends accelerated: countries continued to develop new, increasingly deadly CW (especially nerve agents, manufactured in huge quantities by both sides during World War II but not much used in the central battlefields) and people everywhere rejected CW as illegitimate. There were occasional episodes of use of CW (by Italy in Ethiopia in 1935–1936, by Japan in China in 1937–1945, by Egypt in Yemen in 1963–1967, by Libya in Chad in 1986–1987, and by Iraq and Iran against each other in 1980–1988),<sup>233</sup> but these were widely criticized by the world community. The global diplomatic engagement continued, ultimately producing the comprehensive Chemical Weapons Convention (CWC)<sup>234</sup> in 1993, to prohibit chemical weapons and chemical warfare absolutely.

### B. A Customary Interational Law About Chemical Weapons

An equally remarkable development during the twentieth century (at some point after the 1925 Geneva Protocol and before the 1993 CWC) was the formation of a customary international law rule that outlawed chemical weapons, or at least first use of CW, for all countries, even those that refrained from affiliating with any of the relevant treaties. It is not easy to ascertain exactly when this rule emerged, nor can we be

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231. Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare pmbl., June 17, 1925, 26 U.S.T. 571 [hereinafter Geneva Protocol].

232. U.S. ARMS CONTROL & DISARMAMENT AGENCY, *supra* note 230, at 5; George Bunn, *Banning Poison Gas and Germ Warfare: Should the United States Agree?*, 1969 Wis. L. Rev. 375, 389–94 (1969); McCormack, *supra* note 226, at 7; Roberts, *supra* note 196, at 54–55.

233. JOSEPH CIRINCIONE ET AL., *DEADLY ARSENALS: NUCLEAR, BIOLOGICAL, AND CHEMICAL THREATS* 62–67 (2d ed. 2005); Flowerree, *supra* note 226, at 999–1002; McCormack, *supra* note 226, at 2, n.3; Moon, *supra* note 226, at 666, 668–70; J.P. Perry Robinson, *Origins of the Chemical Weapons Convention*, in *SHADOWS AND SUBSTANCE: THE CHEMICAL WEAPONS CONVENTION* 40 (Benoit Morel & Kyle Olson eds., 1993); Jonathan B. Tucker, *Multilateral Approaches to the Investigation and Attribution of Biological Weapons Use*, in *TERRORISM, WAR, OR DISEASE? UNRAVELING THE USE OF BIOLOGICAL WEAPONS* 270 (Anne L. Clunan et al. eds. 2008).

234. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction, *opened for signature* Jan. 13, 1993, S. TREATY DOC. NO. 103-21, 32 I.L.M. 800 [hereinafter CWC].

completely confident about its exact content. It did not outlaw *possession* of chemical agents, and it might have tolerated a defensive or retaliatory application of lethal chemicals in response to an aggressor's prior CW attack.

But leading authorities concur: CIL, arising from the considered opinion of mankind, and reflecting the world community's collective rejection of this form of combat, banned chemical warfare globally. That ban was independent of the written instruments and was fully binding on the entire world, including the United States, which signed the Geneva Protocol in 1925, but did not ratify it until 1975. No country acted to position itself effectively as a "persistent objector."<sup>235</sup>

There is no authoritative determination by the ICJ that details the origins and content of this CIL rule, but there is plenty of consensus for its establishment. The UNGA in 1969, addressing "the question of chemical and bacteriological (biological) weapons,"<sup>236</sup> noted that these forms of warfare have "always been viewed with horror and been justly condemned by the international community,"<sup>237</sup> and that they are "inherently reprehensible" because their effects "are often uncontrollable and unpredictable and may be injurious without distinction to combatants and non-combatants."<sup>238</sup> The UNGA therefore recognized that "the Geneva Protocol embodies the generally recognized rules of international law prohibiting the use in international armed conflicts of all biological and chemical methods of warfare"<sup>239</sup> and it declared "as contrary to the generally recognized rules of international law," as embodied in the Geneva Protocol, any such use.<sup>240</sup> Then Secretary-General of the United

235. ICRC, *supra* note 111, at 259–63; R.R. Baxter & Thomas Buergenthal, *Legal Aspects of the Geneva Protocol of 1925*, 64 AM. J. INT'L L. 853, 853 (1970) ("The weight of opinion appears today to favor the view that customary international law proscribes the use in war of lethal chemical and biological weapons."); Bunn, *supra* note 232, at 388; McCormack, *supra* note 226, at 5 ("It is generally assumed and commonly argued that the [Geneva] Protocol has become a part of customary international law and therefore binds all states whether or not they have become a party to it."); *id.* at 6 ("No non-party state has ever made the claim that it is not bound by the Protocol and therefore justified in international law to use chemical weapons in warfare."); Schafer, *supra* note 199, at 302; Lisa Tabassi, *Impact of the CWC: Progressive Development of Customary International Law and Evolution of the Customary Norm Against Chemical Weapons*, 63 CBW CONVENTIONS BULL. 1 (2004); Jonathan B. Tucker, *Multilateral Approaches to the Investigation and Attribution of Biological Weapons Use, in TERRORISM, WAR, OR DISEASE? UNRAVELING THE USE OF BIOLOGICAL WEAPONS* 270, 275 (Anne L. Clunan et al. eds., 2008).

236. Question of Chemical and Bacteriological (Biological) Weapons, G.A. Res. 2603-A, GAOR, 24th Sess., Supp. No. 30, U.N. Doc. A/RES/2603A (XXIV) (Dec. 16, 1969)

237. *Id.* pmbl., ¶ 1.

238. *Id.* pmbl., ¶ 2.

239. *Id.* pmbl., ¶ 5.

240. *Id.* ¶ 1; see also Measures to Uphold the Authority of the 1925 Geneva Protocol and to Support the Conclusion of a Chemical Weapons Convention, pmbl., ¶ 4, G.A. Res. 4237-C,

Nations U Thant concurred in this judgment in 1969, asserting that the Geneva Protocol “established a custom and hence a standard of international law.”<sup>241</sup>

To a similar effect is a statement in dicta from the International Criminal Tribunal for the Former Yugoslavia in 1995, asserting in the *Tadić* case that use of CW by Iraq against its own Kurdish minority population would be a violation of CIL:

It is therefore clear that, whether or not Iraq really used chemical weapons against its own Kurdish nationals—a matter on which this Chamber obviously cannot and does not express any opinion—there undisputedly emerged a general consensus in the international community on the principle that the use of those weapons is also prohibited in internal armed conflicts.<sup>242</sup>

Likewise, the ICRC analysis of CIL, noted above, states flatly that “[t]he use of chemical weapons is prohibited,” and “[s]tate practice establishes this rule as a norm of customary international law applicable in both international and non-international armed conflicts.”<sup>243</sup>

For many practical purposes, of course, the existence *vel non* of a CIL rule proscribing CW would now be a moot point, because the 1993 CWC supersedes it for its 188 parties. The treaty constitutes an explicit, comprehensive, and now nearly universal bulwark against CW; it bans possession as well as use (and second use, as well as first use); it establishes an elaborate apparatus of reporting and inspection requirements in order to verify States’ compliance with the obligations; and it creates an international organization to oversee and implement the terms and to impose collective sanctions to punish violators—none of which was (or could be) accomplished via CIL alone.<sup>244</sup>

But the customary international regime is not quite yet fully obsolete. There are still two States that have signed but not ratified the CWC, and five additional States that have not even signed. Those

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GAOR, 84th plen. mtg., U.N. Doc. A/RES/42/37 (Nov. 30, 1987) (referring to the Geneva Protocol “and other relevant rules of customary international law”).

241. The Secretary-General, *Report of the Secretary-General on Chemical and Bacteriological (Biological) Weapons and the Effects of Their Possible Use*, ¶ 7, U.N. Doc. A/7575/REV.1 (June 30, 1969).

242. Prosecutor v. Tadić, Case No. IT-94-1-AR72, Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction, ¶ 124 (Oct. 2, 1995).

243. ICRC, *supra* note 111, at 259. For comparison, it is worth noting that the ICRC has not found that the use of anti-personnel land mines is categorically prohibited by CIL (although certain specific applications of the weapons would be barred by more general LOAC principles) even after two treaties have created explicit restrictions or bans. *Id.* at 280–86.

244. See Organisation for the Prohibition of Chemical Weapons, *The Chemical Weapons Ban: Facts and Figures*, <http://www.opcw.org/publications/facts-and-figures/> (last visited June 30, 2009).

countries (including some of potentially great interest within the CW sector, such as North Korea, Egypt, Syria, and Israel) are bound by the anti-chemical CIL rule, but not by the treaty.<sup>245</sup>

### *C. Comparing Chemical Weapons and ASAT*

The parallels between the chemical weapons case in the twentieth century and the ASAT case in the twenty-first century are striking. In both instances

- a widely reviled weapon had earned significant international opprobrium, with experts and the knowledgeable public considering that form of combat to be shortsighted and reprehensible;
- simultaneously, the weapons were recognized as powerful, potentially decisive in combat, or at least capable of greatly disrupting a country's planned military activities (and, perhaps, the weapons seemed to confer more advantage on an offensive attacker, with less utility for a defender);
- the weapons had proliferated and threatened to spread further (while at the same time, the leading military powers (the United States, the Soviet Union/Russia, and in the case of ASAT, China) possessed by far the greatest inventories, experience, and capacity);
- multiple different types of the weapon were available, and inventive minds could be expected to spawn new technologies in the future (but the old, simple iterations would still work well, too);
- the weapons were extremely imprecise and indiscriminate, with effects spreading unpredictably far from the intended targets, irresponsibly afflicting civilians and neutrals alike;
- the effects of the weapons were notoriously persistent (some CW linger on, and around, the battlefield for a worrisome length of time—but nothing like the decades of danger posed by ASATs); and
- the international community had grappled, with limited success, with each topic, generating treaties and other control

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245. Organisation for the Prohibition of Chemical Weapons, Non-Member States, <http://www.opcw.org/about-opcw/non-member-states/> (last visited June 30, 2009).

regimes that touched on, but did not fully eradicate, the weapon (until the 1993 CWC).

Chemical agents, it is true, attracted greater public notoriety than ASATs have yet drawn, and the state rhetoric casting CW outside the pale of civilized behavior is stronger than what we have lately witnessed regarding ASATs.<sup>246</sup>

On the other hand, the physical evidence for the “objective” side of a CIL rule is even stronger in the ASAT case than for CW. Many more States had pursued and demonstrated a CW capability than have entered into a space weapons race; Western intelligence agencies estimated at the turn of the century that twenty or more countries possessed CW or were assiduously working in that direction.<sup>247</sup> More striking, during the twentieth century, there were far more deviations from the emerging anti-CW rule; many States tested chemical agents and a few used them in combat. Sometimes, States criticizing CW use asserted that such activities were illegitimate and already illegal. Other times (as we now witness with ASATs), the States asserted simply that the weapon was unwise, unwelcome, and adverse for the world.

If that contested pattern of state behavior and commentary sufficed to engender a CIL prohibition on CW, well before the 1993 treaty codified it, then perhaps the world community can likewise employ the robust CIL mechanism to create a no-ASAT taboo even before a comprehensive treaty about space weaponization appears on the horizon.<sup>248</sup>

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246. Moon, *supra* note 226, at 657, 662 (“[C]hemical and biological warfare (CBW) is widely regarded as cruel and inhumane”; after World War I, the Western public “did not accept CW as legitimate” and “gas emerged as a repellent symbol of the protracted slaughter.”); Robinson, *supra* note 226, at 37 (citing “a perception widespread throughout different cultures that fighting with poison is somehow reprehensible, immoral, utterly wrong—that to resort to chemical warfare is to violate a taboo of a particularly deep kind.”); see also CIRINCIONE ET AL., *supra* note 233, at 62–67; THOMAS GRAHAM, JR. & DAMIEN LA VERA, CORNERSTONES OF SECURITY: ARMS CONTROL TREATIES IN THE NUCLEAR ERA 7–10 (2003).

247. GORDON M. BURCK & CHARLES C. FLOWERREE, INTERNATIONAL HANDBOOK ON CHEMICAL WEAPONS PROLIFERATION 164–71 (1991), reproduced at James Martin Ctr. for Nonproliferation Studies, Chemical and Biological Weapons: Possession and Programs Past and Present, <http://cns.miis.edu/cbw/index.htm> (last visited July 19, 2009); CIRINCIONE ET AL., *supra* note 233, at 62–67; Thomas W. Graham, *Weapons of Mass Destruction: Does Globalization Mean Proliferation?*, BROOKINGS INST., Fall 2001, [http://www.brookings.edu/articles/2001/fall\\_weapons\\_graham.aspx?p=1](http://www.brookings.edu/articles/2001/fall_weapons_graham.aspx?p=1) (last visited June 30, 2009); Arms Control Ass’n, *Fact Sheet: Chemical and Biological Weapons Proliferation at a Glance* (Sept. 2002), <http://www.armscontrol.org/factsheets/cbwprolif> (last visited June 30, 2009).

248. *Contra* GUIDO DEN DEKKER, THE LAW OF ARMS CONTROL: INTERNATIONAL SUPERVISION AND ENFORCEMENT 62–66 (2001) (concluding that “[i]n general, in the law of arms control, which after all demands as much clarity and predictability as possible, the concept of treaty law becoming binding as customary international law on States without their express consent is problematic”).

## CONCLUSIONS AND RECOMMENDATIONS

What are the implications of this analysis for the security of outer space and the evolution of a sound legal regime banning ASATs?

I do not pretend that the world community, acting through pious resolutions in the UNGA or proactive speeches in the CD, could slip anything past the United States, China, and Russia. Indeed, it is impossible to imagine crafting a new rule of CIL that overlooked the activities and failed to accommodate the interests of those three leading States. As Secretary of State Dean Rusk soberly advised President John F. Kennedy in 1962, "the U.S. probably cannot keep the Soviets from attempting physical anti-satellite measures if they decide to do so."<sup>249</sup> Similarly, decades later, when U.S. intelligence officials predicted that China was preparing its 2007 kinetic ASAT test in space, the U.S. political leadership decided not even to try to dissuade Beijing from that path; Washington, D.C. estimated that the proposed intervention would likely be unsuccessful in tilting the Chinese from the course they judged to be in their national security interest, and it would be humiliating to try to persuade them, only to fail.<sup>250</sup>

Moreover, it is far from clear that a new CIL rule that banned only the kinetic energy, debris-creating ASATs, while allowing free reign to equally lethal but "cleaner" directed energy systems, would constitute a major gain for the security of outer space. If the new law simply nudged the rivals in the direction of laser beams instead of interceptors, that would not provide much additional protection for spacecraft. That result would mitigate the creation of unnecessary clouds of ASAT-test debris, but the leading military States could simply pursue the alternative technology to hold each others' satellites at continuing risk.

The United States, as noted above, has already largely moved in the direction of non-destructive ASATs, favoring directed energy systems like lasers over the crudely destructive kinetic mechanisms. (Although it is still noteworthy that when confronted in 2008 with the risks posed by the failing USA-193 satellite, the U.S. authorities responded by attacking it with a missile, not a laser.) Other States and observers, however, may well consider that half-step inadequate; only a total ban on ASATs could

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249. See Samuel Black, *Components of a Space Assurance Strategy*, 5 HIGH FRONTIER 16, 17 (2008). In a similar vein, see William Matthews, *Analysts: Protect Sats with Treaties*, DEF. NEWS, June 10, 2008, at 34, available at <http://www.c4isrjournal.com/story.php?F=3572863> (last visited June 30, 2009) (quoting John Steinbruner as saying "[y]ou can't prevent an attack on a satellite; you must delegitimize it").

250. Michael R. Gordon & David S. Cloud, *U.S. Knew of China's Missile Test, but Kept Silent*, N.Y. TIMES, Apr. 23, 2007, at A1 ("[T]he administration felt constrained in its dealings with China because of its view that it had little leverage to stop an important Chinese military program").

preserve the stability of space, for any artifice that attempted to differentiate “good ASATs” from “bad ASATs” would miss the point.

A comparison with another, very different type of weapon, anti-personnel land mines, might be illustrative here. Much of the world has reacted to the indiscriminateness of these weapons by seeking to ban them entirely, and by joining the 1997 Ottawa Mine Ban Treaty.<sup>251</sup> The United States, in contrast, has differentiated between “persistent” and “non-persistent” mines, arguing that the latter category (which neutralize themselves after a fixed, short period of time, and so do not pose a long-term hazard to civilians who later transit battlefields) should be an available military option. Most countries, however, have rejected the effort to segregate mines into “acceptable” and “unacceptable” categories, and have concluded that a comprehensive prohibition is the only viable international approach. A proposal that preserves the (more technologically sophisticated, and therefore more expensive) types of land mines that the United States would prefer to retain, while banning the (simpler, cheaper, more accessible) types that others possess, would be a non-starter.<sup>252</sup> The same logic might inveigh against any two-tiered control regime for kinetic and directed-energy ASATs.

In any event, it is conceptually difficult for a new norm of CIL to crystallize as a binding rule over the objection of the States most “specially affected” by the new standard,<sup>253</sup> particularly when the States most affected are among the planet’s leading military, political, and economic superpowers. The old saw that “when elephants fight, the grass suffers” is as true in outer space as it is on the savannah.

Still, there is more than sleight of hand here. The insistent, threadbare refrain from the Bush administration, in rejecting Russian, Chinese, and other proposals for initiation of talks on “preventing an arms race in outer space” was to the effect that “there is no need” for any new treaty on space weaponization because there currently is no arms race in outer

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251. Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction, Sept. 18, 1997, 36 I.L.M. 1507.

252. See INT’L CAMPAIGN TO BAN LANDMINES, LANDMINE MONITOR REPORT 2008: TOWARD A MINE-FREE WORLD (2008), available at <http://www.icbl.org/lm/2008/> (last visited June 30, 2009) [hereinafter LANDMINE MONITOR REPORT 2008]; Peter Herby & Eve La Haye, *How Does It Stack Up? The Anti-Personnel Mine Ban Convention at 10*, ARMS CONTROL TODAY, Dec. 2007, at 6; Richard G. Kidd, U.S. Dep’t of State, Office of Weapons Removal & Abatement, *U.S. Landmine Policy and the Ottawa Convention Ban on Anti-Personnel Landmines: Similar Path*, Nov. 21, 2007, [http://blogs.state.gov/index.php/entries/anti\\_personnel\\_landmine/](http://blogs.state.gov/index.php/entries/anti_personnel_landmine/) (last visited June 30, 2009).

253. North Sea Continental Shelf (F.R.G. v. Neth.), 1969 I.C.J. 3, 42 (Feb. 20) (demanding that the States whose interests are most specially affected must participate in an evolving rule for it to rise to the level of a general CIL); Ramey, *supra* note 7, at 69–70.



space, nor any immediate prospect of initiating one.<sup>254</sup> The analysis in this Article turns that conclusion on its head, suggesting that “there is no need for a new treaty” for a very different reason: because even in the absence of a signed document, the emergence of an unwritten CIL rule may already (or soon) accomplish some of the same work.

A new ASAT treaty, of course, would carry many salient advantages. An agreed document would provide greater clarity about the content of the rule and about the fact that it was, indeed, legally binding. A new treaty could cover more verbs than merely “test” or “use”; it could expand CIL’s coverage by prohibiting countries from developing, possessing or transferring ASATs, and could require them to dismantle any ASAT mechanisms currently held. A treaty, as with the CWC, could generate necessary verification mechanisms and procedures, to anticipate and resolve satisfactorily any implementation or compliance controversies; verification and enforcement are always severe challenges for arms control, and a future space treaty would have to confront them squarely. In the same vein, a comprehensive ASAT treaty could elicit a new international organization, which could stimulate additional opportunities for peaceful cooperation in space.<sup>255</sup>

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254. See generally the Bush administration’s statements asserting that there is “no need” for new arms control measures in outer space, *in* sources cited *supra* note 100.

Notably, the Bush administration’s 2006 National Space Policy document explicitly affirms that the United States “will oppose the development of new legal regimes or other restrictions” that would limit national access to or use of space. That formula, embracing “agreements or restrictions,” would cover both new treaties and new CIL rules. U.S. National Space Policy, *supra* note 7, at 2.

255. See MOLTZ, *supra* note 20, at 31; Philip J. Baines, *Adequate Verification: The Keystone of a Space-Based Weapons Ban*, *in* SAFEGUARDING SPACE SECURITY, *supra* note 21, at 87; Nancy Gallagher, *Towards a Reconsideration of the Rules for Space Security*, *in* PERSPECTIVES ON SPACE SECURITY 1, 35 (John M. Logsdon & Audrey M. Schaffer eds. 2005) (asserting that improved space security is “likely to require formal negotiations, legally binding agreements, and implementing organizations that have both resources and political clout”); Tannenwald, *supra* note 20; Walsh, *supra* note 74; Richard L. Williamson, Jr., *Hard Law, Soft Law, and Non-Law in Multilateral Arms Control: Some Compliance Hypotheses*, 4 CHI. J. INT’L L. 59 (2003) (evaluating the ability of different forms of international law to drive countries to conform to accepted norms); Duan Zhanyuan, *Some Considerations About the Verification Issue of Preventing Outer Space Weaponization*, *in* SAFEGUARDING SPACE SECURITY, *supra* note 21, at 83; Geoffrey Forden, *After China’s Test, Time for a Limited Ban on Anti-Satellite Weapons*, ARMS CONTROL TODAY, Apr. 2007, at 19, 23 (concluding that “[t]he time is right for a treaty banning the testing of the most dangerous ASAT systems”); *cf.* John B. Bellinger III, Legal Adviser to the Sec’y of State, The United States and the Law of the Sea Convention, Remarks at Boalt Hall, University of California Berkeley School of Law (Nov. 5, 2008), available at <http://bjil.typepad.com/publicist/2009/03/publicist01-bellinger.html> (last visited June 30, 2009) (arguing, in a different context, that the United States should join the Law of the Sea Convention, even though many of its key terms are now accepted as binding CIL, because CIL by itself is insufficiently clear and reliable and does not secure all the benefits that ratification of the treaty would provide).

But there are offsetting advantages to non-treaty systems, too. First, as noted above, a CIL rule reaches the entire world community (except for any “persistent objectors”) immediately. In contrast, even a widely accepted document would require many years to approach universality, and some persistent “holdouts” are likely.<sup>256</sup>

At the other end of the timeline, a CIL rule would also continue to apply to any State that initially joined a treaty, but later changed its mind and decided to withdraw from it.<sup>257</sup> Treaty withdrawals are rare, but the United States’ 2002 pullout from the 1972 Anti-Ballistic Missile Treaty<sup>258</sup> and North Korea’s 2003 withdrawal from the 1968 Non-Proliferation Treaty<sup>259</sup> suggest that this is no longer a trivial consideration. Similarly, if a treaty party exercises its right to “suspend” temporarily the operation of a treaty (as, for example, in response to another party’s material breach of the obligations), any underlying CIL obligations could still be applicable.<sup>260</sup>

Even the negotiation phase of a treaty can be extended and convoluted—a reality that somewhat reverses the traditional notion (perhaps inspired by cases like *The Paquete Habana*) that the creation of CIL

256. Even the 1968 Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 21 U.S.T. 483, 729 U.N.T.S. 161 [hereinafter Non-Proliferation Treaty], widely regarded as the most successful arms control instrument in history, has not achieved truly universal adherence, as India, Pakistan, and Israel have always remained outside the regime, and North Korea, formerly a party to the treaty, withdrew from it. See List of Non-Proliferation Treaty Parties, [http://disarmament.un.org/TreatyStatus.nsf/NPT%20\(in%20alphabetical%20order\)?OpenView](http://disarmament.un.org/TreatyStatus.nsf/NPT%20(in%20alphabetical%20order)?OpenView) (last visited June 30, 2009). See generally David S. Jonas, *Variations on Non-Nuclear: May the “Final Four” Join the Nuclear Nonproliferation Treaty as Non-Nuclear Weapon States While Retaining Their Nuclear Weapons?*, 2005 MICH. ST. L. REV. 417.

Also, some treaties are not intended to attract all countries, and some treaties are deliberately drafted with a limited scope (for example, many LOAC treaties differentiate between internal and international wars). ICRC, *supra* note 111, at xxviii.

257. The CWC, like many other arms control accords, allows a treaty party to withdraw if it decides that extraordinary events have jeopardized its “supreme interests,” but it specifies that withdrawal “shall not in any way affect the duty of States to continue fulfilling the obligations assumed under any relevant rules of international law, particularly the Geneva Protocol of 1925.” CWC, *supra* note 234, art. XVI(2)–(3).

258. Treaty on the Limitation of Anti-Ballistic Missile Systems, U.S.-U.S.S.R., May 26, 1972, 23 U.S.T. 3435; Press Release, The White House, ABM Treaty Fact Sheet, Dec. 13, 2001, available at [http://www.nti.org/e\\_research/official\\_docs/pres/121301pres.pdf](http://www.nti.org/e_research/official_docs/pres/121301pres.pdf) (last visited June 30, 2009).

259. Non-Proliferation Treaty, *supra* note 256; Nuclear Age Peace Found., *North Korea’s Statement of Withdrawal from the Nuclear Non-Proliferation Treaty*, NUCLEARFILES.ORG, Jan. 10, 2003, [http://www.nuclearfiles.org/menu/library/treaties/non-proliferation-treaty/trty\\_npt\\_north-korea-withdrawal\\_2003-01-10.htm](http://www.nuclearfiles.org/menu/library/treaties/non-proliferation-treaty/trty_npt_north-korea-withdrawal_2003-01-10.htm) (last visited June 30, 2009).

260. See, e.g., Vienna Convention on the Law of Treaties, *supra* note 141, art. 60 (establishing rules for suspending the operation of a treaty in response to another party’s breach); see also Duncan B. Hollis, *Russia Suspends CFE Treaty Participation*, ASIL INSIGHTS, July 23, 2007, <http://www.asil.org/insights070723.cfm> (last visited June 30, 2009).

takes a great deal of time, while treaties offer the advantage of speed. In fact, in recent years the national security arena has witnessed a growing trend toward non-treaty-based arrangements, for precisely this reason. The Proliferation Security Initiative (PSI), to cite one example, is an informal, unwritten, non-legally-binding agreement among more than ninety participating States, led by the United States, to coordinate policies and to practice interdiction routines for blocking the spread of nuclear weapons and other weapons of mass destruction. Its advocates methodically refer to PSI as “an activity, not an organization,” and stress that the quick and unproblematic implementation of the program is at least partially due to its sponsors’ decision to eschew the formal trappings of a treaty—by dodging the wordsmithing of lawyers and the niceties of negotiations, proponents were able to get the program established promptly and to enlarge its subsequent operations without painstaking renegotiation and ratification.<sup>261</sup> Other examples, perhaps reflecting a gravitation away from treaties and toward informal operating principles comparable to CIL, could include numerous export control regimes, attempting to align national policies regarding access to missile technology, chemical and biological substances, and conventional weaponry.<sup>262</sup>

Other non-treaty approaches may also make a valuable contribution to preservation of the security of outer space. Non-legally-binding “codes of conduct” or “rules of the road” can facilitate the evolution of a *modus vivendi*, becoming increasingly reliable over time. The device of “unilateral, parallel statements of intention,” through which the participants each declare what their policies in outer space will be, can drive

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261. Bureau Int’l Security & Nonproliferation, U.S. Dep’t of State, *Fact Sheet: Proliferation Security Initiative*, May 26, 2008, <http://merln.ndu.edu/archivepdf/wmd/State/105217.pdf> (last visited July 29, 2009); see also John R. Bolton, Op-Ed., *An All-Out War on Proliferation*, FIN. TIMES, Sept. 7, 2004, at 21 (noting, as U.S. Undersecretary of State, that “[w]e say that PSI is ‘an activity, not an organization,’” because it does not rely on formal legal institutions).

262. For example, the Missile Technology Control Regime is a multilateral effort to retard the proliferation of equipment and technology that could contribute to national or terrorist missile programs; it consists essentially of voluntary coordinated national export control systems in participating States, independent of any legal compulsion. Bureau of Int’l Security & Nonproliferation, U.S. Dep’t of State, *Fact Sheet: Missile Technology Control Regime*, Feb. 27, 2008. The Australia Group is a comparable non-legally-binding agreement among like-minded States to restrict their exports of chemical and biological materials that have weapons potential. Bureau of Int’l Security & Nonproliferation, U.S. Dep’t of State, *Fact Sheet: The Australia Group*, Aug. 10, 2004. The Wassenaar Agreement provides similar coordination for export controls related to conventional weapons and dual-use items. Bureau of Int’l Security & Nonproliferation, U.S. Dep’t of State, *Fact Sheet: Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies*, Mar. 22, 2004; see also Waldrop, *supra* note 16, at 189–93 (evaluating the contribution that export control regimes can make in protecting access to sensitive space technology with weapons applications).

the key actors toward a practical accommodation, even without reaching any formal "agreement" on paper.<sup>263</sup> At the simplest level, merely ratcheting back each country's rhetoric, national policy statements, and hyperbolic threat assessments could help cool tempers and pave the way for more restrained conduct.<sup>264</sup> Recall, in this context, the fact that for twenty blessed years—from the U.S. MHV test in 1985 until the first Chinese interceptor experiment in 2005—there were no reported ASAT tests in space by any country, even without any treaty or other overt expression of an agreement for self-restraint.<sup>265</sup>

Ironically, there is one way in which even a U.S. administration that was reflexively opposed to new measures of arms control in space might find itself more predisposed to a new PAROS treaty than to a regime led by CIL. That is, suppose that U.S. leadership, such as under the George W. Bush administration, perceived that the leaders of much of the rest of the world were issuing public statements that tended to support the notion, as discussed above, that testing and use of ASAT systems was already a violation of the world community's expectations and settled sense of legitimacy. The U.S. leaders might warily observe the incipient creation of a new CIL that would impose a universal rule against ASAT weapons (either the kinetic variety, the directed energy variety, or both). Still, the United States might take comfort in the notion that by publicly and explicitly opposing that emerging rule, the country could exempt itself from it, firmly claiming status as a "persistent objector."

But those volleys of contrary public statements would not necessarily be the end of the story. Suppose that a subsequent U.S.

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263. For example, when the Strategic Arms Limitation Talks (SALT) I Interim Agreement on Strategic Offensive Arms expired in 1977 and the SALT II Treaty had not entered into force, the United States and the Soviet Union agreed to extend the operation of the older treaty, and provisionally to observe the newer instrument, via an exchange of parallel, unilateral national statements. These declarations were non-legally-binding, but they carried substantial political weight and guided international practice nonetheless. See GRAHAM & LAVERA, *supra* note 246, at 344–46; see generally ARMS CONTROL WITHOUT NEGOTIATION: FROM THE COLD WAR TO THE NEW WORLD ORDER (Bennett Ramberg ed., 1993).

For contrasting views on the efficacy of legally binding and non-legally-binding approaches to arms control in space, see James P. Lampertius, *The Need for an Effective Liability Regime for Damage Caused by Debris in Outer Space*, 13 MICH. J. INT'L L. 447 (1991); Steven A. Mirmina, *Reducing the Proliferation of Orbital Debris: Alternatives to a Legally Binding Instrument*, 99 AM. J. INT'L L. 649 (2005).

264. See MOLTZ, *supra* note 20, at 38 (noting various approaches to reducing the incipient threat to space security, and cautioning against hyping the threat, because excessive articulation of the potential for hostile action in space risks becoming a self-fulfilling prophecy).

265. GREGO, *supra* note 64 (citing the Soviet Union's voluntary moratorium on ASAT testing during the 1980s, which was matched by the United States); Theresa Hitchens, *Rushing to Weaponize the Final Frontier*, 31 ARMS CONTROL TODAY 16 (Sept. 2001) (characterizing an unspoken "gentlemen's agreement among the world's space-faring nations to refrain from putting weapons in space").

administration, perhaps one led by a liberal Democrat who favored arms control in space, wanted to move in a different direction. The new leadership could then issue public statements that recanted its predecessor's antipathy to the new CIL rule. The United States would then surrender its status as a persistent objector, and become bound by the new international law rule. Even if the domestic electoral politics then switched yet again, and a third president expressed opposition to the anti-ASAT rule, it might be too late; the United States could not escape liability under the CIL rule, and could not effectively reestablish itself as a dissenter.

Notably, the decision to end the U.S. posture as a persistent objector is one that could typically be undertaken by a president unilaterally, without any congressional participation. On the other hand, a treaty—whether it limited ASATs in strict way, in a minor way, or not at all—would require the advice and consent of two-thirds of the Senate to entrench the rule as a binding legal obligation for the United States.

Fortunately, international law does not require advocates to select just one tool; legally binding treaties, politically binding “rules of the road,” unwritten “gentlemen’s agreements,” and all the rest can make their distinct contributions. A new PAROS treaty would surely constitute the clearest, most reliable mechanism for promoting security in space. But CIL, too, belongs on the advocate’s list; it can provide a complementary tool for reining in the weaponer’s instincts.

In any event, this is an area in which prompt action is necessary. Unless some effective combination of appropriate jurisprudential tools is asserted quickly, the imminent weaponization of outer space may soon become irreversible. As Thomas Graham Jr. expresses it, “[t]he history of the last fifty years teaches us that, if dangerous weapons and technologies are to be controlled to the safety and security of all, it must be done early, before the programs become entrenched. That time may well be now with respect to weapons in space.”<sup>266</sup>

We can now assert that if any CIL regime is to be established as part of the control regime for ASAT weapons, the crucial components include what States *do* (i.e., we would look for a continuing pattern of self-restraint on the part of the United States, Russia, and China, as well as any other possible new entrants into the competition, in testing and using ASATs) and what they *say* (i.e., how do the other members of the world community react when one State does undertake an ASAT-related activity?).

The most powerful speeches in this regard would assert that an ASAT test (and, *a fortiori*, any ASAT use) would be illegitimate, not just unwelcome—it would be incompatible with the settled expectations of

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266. Graham, *supra* note 76, at 16.

the world community, no longer an acceptable action for a civilized country to undertake. Countries would have to begin to assert, in the UNGA, the Committee on the Peaceful Uses of Outer Space, the CD, and elsewhere, that ASATs (or at least, debris-creating ASATs) were not just deleterious for global peace and security, but also that they were already unjustified, unacceptable, and therefore illegal.

Such a strategy might also be adapted for achieving new restraints on other types of weapons, too. Both anti-personnel land mines and cluster munitions have drawn robust international criticism on humanitarian grounds. Their distressing tendency to afflict civilians and other non-combatants long after the soldiers have marched away and the war has terminated sits uncomfortably against the LOAC standards of discrimination, proportionality, and necessity. In each area, new treaties have begun the laborious task of ridding the world of the scourge of unintended civilian casualties, but in each area, the major weapons-possessing States have generally refrained from adhering.<sup>267</sup> CIL may therefore offer an alternative, complementary approach: stigmatize the weapons as globally unacceptable, even for countries that eschew the formal treaty obligations. A new treaty on “explosive remnants of war” may also point the way, perhaps one day driving the world community to unite against all manner of weapons—land mines, cluster bombs, and ASAT-generated debris—that linger too long, affect too many civilians, and jeopardize civil society’s ability to access and enjoy important places and resources.<sup>268</sup>

This is the magic of “the ceaseless dialectic”<sup>269</sup> of CIL, a jurisprudence that grows incrementally via a process of assertion and reaction, claim and response: countries advance perspectives about what the law is and ought to be, and depending on the considered reactions of their

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267. See CONVENTIONAL WEAPONS MEMORANDUM, *supra* note 188; LANDMINE MONITOR REPORT 2008, *supra* note 252; John Borrie, *How the Cluster Munition Ban Was Won: Oslo Treaty Negotiations Conclude in Dublin*, DISARMAMENT DIPL., Summer 2008, available at <http://www.acronym.org.uk/dd/dd88/88jb.htm> (last visited June 30, 2009); Herby & La Haye, *supra* note 252, at 6.

268. Protocol on Explosive Remnants of War, Jan. 21, 2009, S. TREATY DOC. NO. 109-10 (2006). This protocol would not directly apply to orbital debris because the treaty’s terms confine it to explosive remnants of war “on the land territory” of its parties, and because it deals only with ordnance that “should have exploded but failed to do so.” *Id.* arts. 1(2), 2(2). Still, the ethos of the treaty resonates: countries should avoid generating unnecessary hazards, even under the stresses of wartime, and after the war, they should clean up the messes they do create.

269. W. Michael Reisman, *Assessing Claims to Revise the Laws of War*, 97 AM. J. INT’L L. 82 (2003).

neighbors, the gap between the “is” and the “ought” becomes narrowed.<sup>270</sup>

This is also a leading instance of how the apparently less-powerful countries can, with strategic deliberation, exert a greater influence over the planet’s major States—or, at least, how they do not have to wait for them in order to push for the progressive development of law. While a recalcitrant United States can effectively block any effort to articulate a formal ASAT treaty in the CD, it cannot similarly squelch other countries’ foreign ministries from asserting contrary views into the public domain—views that can cascade into a new CIL rule. It is hard to imagine a space-related treaty moving very far forward without the participation of the leading spacefaring countries, but it is at least conceivable that the public dialogue can proceed more rapidly than some of those States might wish.<sup>271</sup>

That global public dialogue, in the long term, may help change the terms of the debate; create some long-overdue momentum toward a meaningful, legally binding inhibition on ASATs; and ultimately help elicit more “satisfaction” in the secure exploration and exploitation of outer space.

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270. Myres S. McDougal, *The Hydrogen Bomb Tests and the International Law of the Sea*, 49 AM. J. INT’L L. 356, 357 (1955) (characterizing CIL as “a process of continuous interaction, of continuous demand and response” by affected nations); *National Sovereignty of Outer Space*, 74 HARV. L. REV. 1154, 1961 (1961).

271. Lesley Wexler, *The International Deployment of Shame, Second-Best Responses, and Norm Entrepreneurship: The Campaign to Ban Landmines and the Landmine Ban Treaty*, 20 ARIZ. J. INT’L & COMP. L. 561 (2003) (noting that like-minded States proceeded without the United States, Russia, and China in developing and strengthening international norms and in creating a treaty to ban anti-personnel landmines); see also Borrie, *supra* note 267, at 40 (describing how a similar process led like-minded States to craft a treaty banning cluster bombs, even over the opposition of the United States, Russia, and China).